Characterisation Studies of locally-produced Wares from the A1, near Wetherby

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Excavations on the line of the A1 just north of Wetherby revealed a medieval settlement, occupied from the later 11th or 12th centuries through to at least the 16th century. The vast majority of the pottery found contains overgrown quartz grains or sandstone fragments which probably originated in Millstone Grit or Coal Measure sandstones and usually contain lenses of light-firing clay or light-firing mudstones which indicate that the parent clay was probably Coal Measures mudstone. Nevertheless, despite the family resemblance between almost all of these wares there is a high degree of variation in texture, colour and the incidence of various inclusion types. This was used by Jane Young to divide the pottery into two basic classes: vessels tempered with grit (i.e. inclusions greater than 1.0mm, ranging up to 3.0 or 4.0mm across) and those tempered with sand (i.e. inclusions in the main less than 1.0mm, and often less than 0.5mm across). The former were given the code NGR and the latter MEDLOC. Within each class, subfabrics were identified and given a fabric number, leading to the definition of over 50 fabric groups. Where enough samples could be found, and limited by the available budget, six samples of each fabric group were taken and thin sections and chemical analyses obtained (Appendix 1).

The thin sections were then examined, fabric by fabric, and if any section did not fall within the textural, inclusion or groundmass characteristics of the remainder it was removed from the group, or if possible assigned to a separate group. At this time, it was found that in two cases sherds with very different appearances in the hand were actually parts of the same vessel, which provides information on the variability of the fabric within a single vessel. This process eventually led to the definition of 22 MEDLOC fabrics and 26 NGR fabrics (one of which is an amalgamation of two initial fabric groups, 16/17). Because of the re-assignment of samples, some of these groups contained up to 9 samples, whereas others consisted of single samples.

Typological evidence, supported by stratigraphic associations, suggests that these vessels range in date from the later 12th/13th century through to the 15th to 16th centuries and by using a combination of stratigraphic associations and typology Jane Young was able to assign each of the fabrics to one or two of three chronological groups:

Group A (12th to mid 13th): 27 samples, from 5 fabric groups (all NGR)

Group B (13th to 15th): 104 samples, from 12 NGR and 17 MEDLOC fabric groups

Group C (late 14th to 15th): 13 samples, from 3 NGR and 1 MEDLOC fabric groups

In addition, there were 15 samples from fabric groups which probably spanned Groups A and B and four samples from fabric groups which probably span Groups B and C. Unfortunately, also, it is likely that Group B, which is partly defined typologically, overlaps with both A and C. Nevertheless, this division does make it possible to examine the fabric data for signs of chronological trends which might represent either changes in manufacturing practice (such as the progressive fine-ness of the temper) or changes in source.

Petrological Analysis

Although few of the 175 thin sections of locally-produced wares were identical, there were strong similarities between them. Often, indeed, a description of two fabric groups showed no difference, even though the sherds were dissimilar to the naked eye and in their texture. this suggests that the samples, in the main, were made from very similar raw materials.

Description

The following inclusion types were observed in the Wetherby NGR and MEDLOC thin sections:

- Angular quartz and feldspar grit. Moderate to abundant. The quartz grains usually have evidence of overgrowth and the feldspar grains are slightly altered. This grit is the distinguishing feature of NGR, although sparse fragments also occur in the MEDLOC sections. Similarity in size and other characteristics (such as the presence of polycrystalline grains with sutured boundaries and strained extinction) suggests that the larger grains are derived from coarse Millstone Grit sandstones. Grains less than c.0.5mm across could be derived either from these coarse grits or from finer-textured sandstones, some of which have a red cement.

- Mudstones. Ranging from c.0.5mm to several mm across, and varying in size and frequency from section to section. There are also differences in the character of these mudstones between fabric groups. Only three samples, NGR fabric 27, and two vitrified NGR samples, contained no mudstone fragments.

    - Dark brown with no silt or fine sand inclusions. Observed in samples of YG; NGR fabrics 1, 2, 4, 5, 7, 8, 10, 11, 13, 14, 15, 16/17, 18, 19, 20, 21, 23 and 24.

    - Light firing with no silt or fine sand inclusions. Observed in samples of YG;NGR fabrics 5, 8,. 10, 11, 14, 15, 16/17, 21 and 23.

    - Dark brown with a fine quartz sand. Observed in samples of NGR fabrics 12, 13, 19 (where it was clearly detrital) and 27.

    - Light firing with a fine quartz sand. Observed in samples of NGR fabric 9.

  - Light-brown inclusionless. Observed in samples of NGR fabric 6.
  - Light brown with abundant quartz and muscovite silt. Noted only in NGR fabric 22.
  - Reduced with alternative light and dark beds and strong bedding. Observed in samples of NGR fabrics 5 and 26.
  - organic. Observed in samples of NGR fabrics 2, 3 and 16/17.

- Opaque grains. Sparse to moderate.
- Dark red/brown clay/iron grains. Sparse to moderate.
- Muscovite laths. Sparse, up to 1.0mm long. Only noted in NGR fabrics 13 and 27.
- Coarse-grained sandstones, usually with overgrown grains and some kaolinite cement. Noted in YG; all NGR fabrics except for fabrics 1, 20 and 21.
- Medium-grained sandstone, usually with some red cement. Observed in samples of NGR fabrics 3, 11, 14, 18, 19, 20 and 21.
- Siltstones. Rare. Present in two MEDLOC samples (one ungrouped and fabric 5)
- Fine-grained sandstones. Observed in samples of MEDLOC fabrics 1, 4, 5, 6 and 27; NGR fabrics 6, 7, 15, 16/17, 22, 23, 24 and 27.
- Rounded quartz grains. Sparse to rare except in MEDLOC 22.

The groundmass usually consists of optically anisotropic baked clay minerals varying in colour and texture. Quartz silt/fine sand up to 0.3mm across is usually present but can be sparse and the clay is either completely light-firing (rare) or more usually variegated with streaks and lenses of lighter and darker (redder) clays.

Exceptions are MEDLOC fabrics 13 and 21 and NGR fabric 22 which contain abundant angular quartz and muscovite laths, up to 0.2mm long, in a light brown-firing groundmass. NGR fabric 9 has a similar texture but is lighter-firing. Other exceptions contain abundant quartz, either of silt (less than 0.1mm, MEDLOC fabric 18) or fine sand (less than 0.2mm, MEDLOC fabrics 5 and 12) grade.

Dark brown inclusionless, or near-inclusionless, groundmasses were noted in MEDLOC fabric 4 and NGR fabrics 1, 18 and 19. A dark brown groundmass with sparse angular quartz up to 0.2mm was noted in NGR 12. A variegated light- to dark brown inclusionless groundmass was noted in NGR fabric 2.

MEDLOC fabrics 6 and 6 and NGR fabrics 6 and 26 have groundmasses composed solely of light-firing inclusionless, or near-inclusionless, clay.

A summary of the main characteristics of each of the fabric groups is given in Appendix 2.

Interpretation

In thin section, the NGR and MEDLOC samples show a strong family resemblance although there are variations in the range of inclusions found in the sections and in their relative frequency.

It is likely that the majority, if not all, of the samples were produced using weathered mudstones, and relict clay and/or mudstone fragments are present in most of the fabrics, often reaching several mm across. The dark brown mudstone fragments are coloured by iron and in some cases can be opaque whilst in others the mudstone grades from dark brown to almost white in the same fragment. This iron staining sometimes runs across the bedding and is clearly secondary to deposition. These dark brown mudstones are often well rounded and may be detrital, although some show no sign of rounding.

In most cases, the texture and colour of the mudstone fragments is matched by the groundmass, suggesting that a fine angular quartz sand (c.0.1mm to 0.2mm across) is naturally present in the clay. Most thin sections reveal a groundmass which is variegated, with lenses and streaks of lighter- and redder- firing clays and these suggest that the parent clay includes light-firing beds with a similar texture to that of the more common red-firing clays. Some of the lighter-coloured mudstones appear black in thin section, and these can be surrounded by a black halo. This is clear evidence that some of these mudstones are organic. Taken as a whole, these features indicate that the NGR and MEDLOC fabrics were produced from mudstones laid down as part of a coal measure, which exhibits the typical cyclic deposition of silt > mudstone > seat earth > coal. Such coals occur most often locally in the Coal Measures, but are also present in the Millstone Grit series. The fine sand content is a distinctive feature of this mudstone, and is not matched, for example at Baildon, Thorner, Lumley Farm or Winksley where otherwise similar weathered mudstones were utilised. It is present in a minority of the mudstone fragments, but this may be because the mudstones tend to cleave along the more sandy bedding planes.

The characteristics of the parent clays used for NGR and MEDLOC fabrics do not in themselves indicate a Carboniferous date for the parent rock, since similar coal measures occur in the Middle Jurassic of the North Yorkshire Moors and were utilised in the Brandsby-type pottery industry. However, the coarser fraction, which is evidently an added temper, present in almost all of these sections includes fragments of coarse-grained sandstones (with grains ranging up to 1.5mm across), which can only be derived from the Millstone Grit, together with medium- and finer-grained sandstones, often with a red iron-rich cement,

which could be of Millstone Grit or Coal Measures origin (or indeed from the Middle Jurassic). The rare rounded quartz grains are might be of Permian or Triassic origin, but are in the main found in such small quantities that they probably do not indicate that the detrital sand drained the lower Permian sands, since they could be wind-transported during an interglacial or post-glacial period. However, in one case, MEDLOC fabric 22, the rounded sand, which includes a high proportion of chert, has a similar groundmass as the other fabrics.

The Carboniferous Coal Measures do not, however, outcrop at Wetherby, nor in the area immediately around the site, situated to the north of the town. There are small outcrops to the west of Ripon (utilized by the Lumley Farm and Winksley potters). Other outcrops are well to the west (e.g. Baildon) or south of Wetherby, such as Potterton, whose place-name, indicating pottery production, is first recorded in Domesday Book c.1086. The parish of Potterton bounds that of Thorner on its northern side and is a strong candidate to be the source of the York Gritty ware found at York. Thorner itself, however, is situated on Millstone Grit, including siltstones and mudstones which are the source of the clays used in the pottery industry there. No Coal Measures outcrop at Thorner and the mudstone fragments found in the Thorner samples have no fine quartz sand inclusions. Therefore, with the exception of the York A ware, Thorner does not seem to have been the source of any of the Wetherby pottery.

From the petrological evidence, therefore, the bulk of the Wetherby pottery, in fabrics YG, NGR and MEDLOC, could come from Baildon Moor or from Potterton, or from one or more unknown (or unsampled) sources where weathered Carboniferous mudstones and organic shales outcrop. The closest outcrops to the site occur in the valley of the Crimple Beck (Millstone Grit), to either side of the Cayton Gill Shell bed, although these were certainly not utilised by the Follifoot potters, whose known kiln utilises red-firing, sandy quaternary clays. Mapped coals are even further away from the site, in the Millstone Grit to the north of Harrogate and west of Knaresborough, or on the north-east fringes of Leeds. Such coals would be associated with white-firing seatearths and organic shales, and are probably the source of the light-firing clays used on their own in NGR fabrics 6, 9 and 26 and in combination with redder-firing clays in YG and most of the other NGR fabrics and the organic shales found in NGR fabrics 2, 3 and 16/17. It is quite likely that thin, commercially unviable coal seams occur in the Millstone Grit and Coal Measures in other places than those mapped by the British Geological Survey, but it is still clear that these “local” fabrics could not have been made within 3 or 4 miles of the site and probably come from even further afield.

Chemical Analysis

Inductively-Coupled Plasma Spectroscopy (ICP-AES) was carried out at the Department of Geology, Royal Holloway College, London and a range of major elements (measured as percent oxides, App.1) and minor and trace elements (measured as parts per million, App. 2) were measured.

Silica was not measured directly but was estimated by subtracting the sum of the major measured elements from 100%. Fig 1 shows the range and mean values for the Wetherby samples by chronological group and shows that there is actually no sign of any trend.

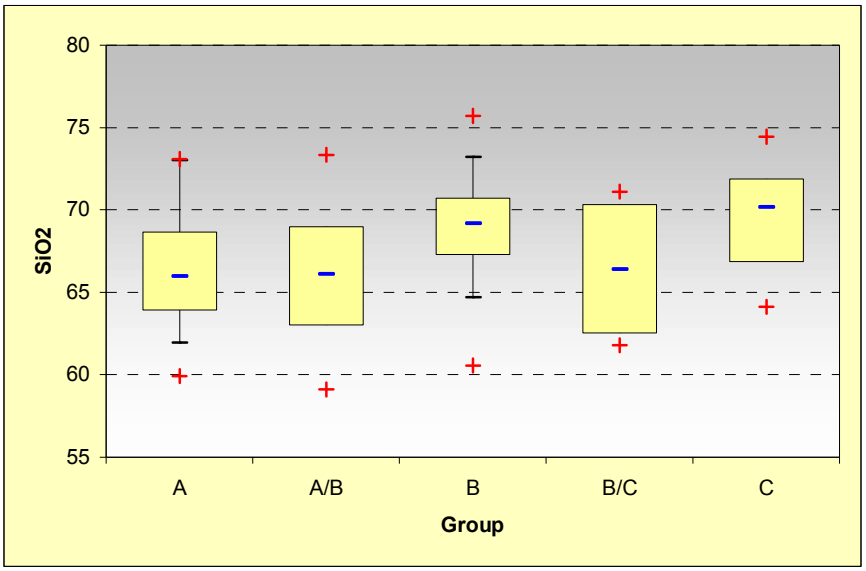

Figure 1

Similarly, there is no sign of any difference in silica content between the NGR and MEDLOC fabrics, although there is between these two and the samples of York A ware and YG ware from the site (Fig 2), with the YG ware have a lower silica context (as a result of a finer-textured groundmass, despite its coarse grit temper).

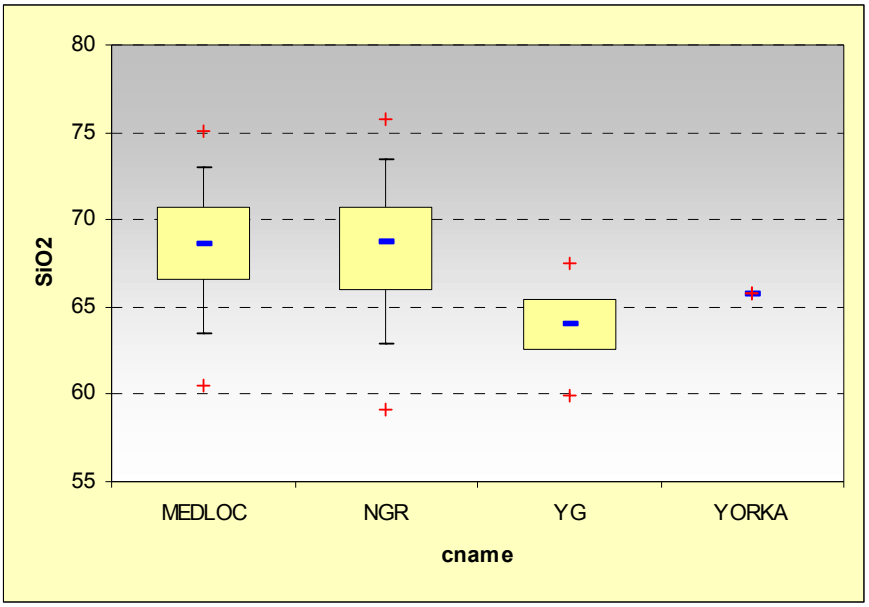

Figure 2

The data were then normalised to Aluminium, to take account of variations in sand and grit tempering, and analysed using Factor Analysis. Six separate analyses were undertaken. Each one first examined just the samples from the Wetherby site and then included comparative data from West Yorkshire production sites:

- Baildon
- Follifoot
- Knaresborough (four samples from occupation sites, but representing the most common pottery type used in the town, a settlement for which there is documentary evidence for production).
- Lumley Farm, Grantley (coded here as 'Ripon'. This site is in the next parish to the south of Winksley and should probably be considered as part of the same industry)
- Mirfield (a series of samples from the modern clay pit used by John Hudson, chosen to represent the widest range of colours and textures)
- Thorner
- Winksley

In addition, the datasets then included all Wetherby samples which could belong to one of the three chronological groups, so that the first dataset includes fabrics used in group A/B, but these are also included in the second dataset, alongside all those assigned to B and B/C.

All the analyses excluded Calcium, Phosphorus and Strontium, since all three are affected by burial conditions, and Lead, which may include contamination from glaze.

Group A

This dataset included, in addition to the relevant NGR and MEDLOC samples, the YG and York A samples from Wetherby.

Factor analysis of the Wetherby Group A finds alone revealed four factors. A plot of F1 against F2 (Fig 3) shows that there is no difference in the mean F1 scores for any of the fabrics, except for the York A sample, which has a higher F1 score than the remainder.. The F2 scores, however, show overlapping ranges for all the fabrics but with each fabric having a different mean. NGR 4, NGR 22 and the YG samples have similar means and ranges, all positive, whereas NGR 14 has a range which is solely negative. NGR 6, NGR 11 and NGR 18 have wider ranges, overlapping with the other fabrics. NGR 7 has a narrow range overlapping with several other fabrics.

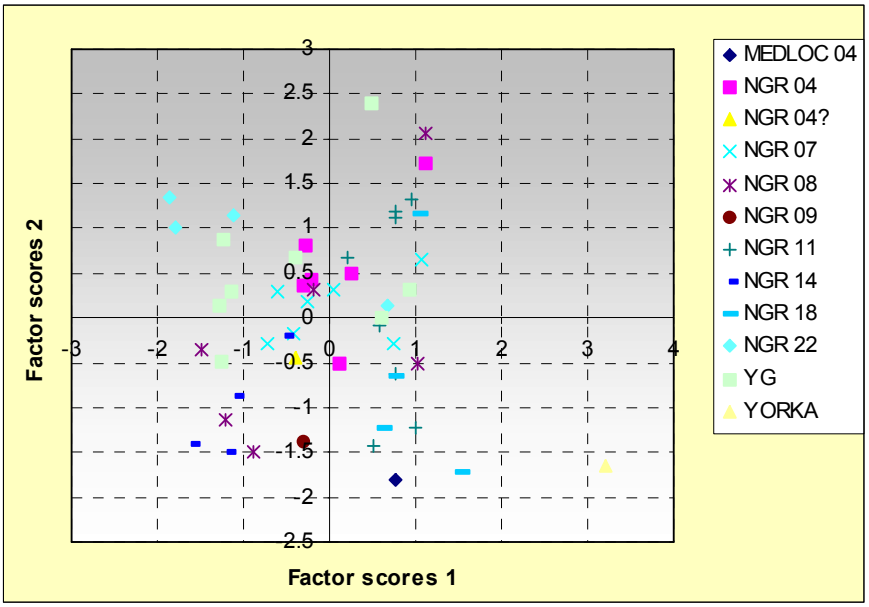

Figure 3

A plot of F3 against F4 scores (Fig 4) indicates that NGR 22 is distinguished from the remainder by its F3 scores whilst all the remaining samples form a single cluster, although within this cluster some of the fabrics have different ranges.

Taken as a whole, the results of this factor analysis suggest that the York A and NGR 22 samples form a distinct group but that the remaining groups, including the YG samples, have minor differences between them but are essentially similar in composition.

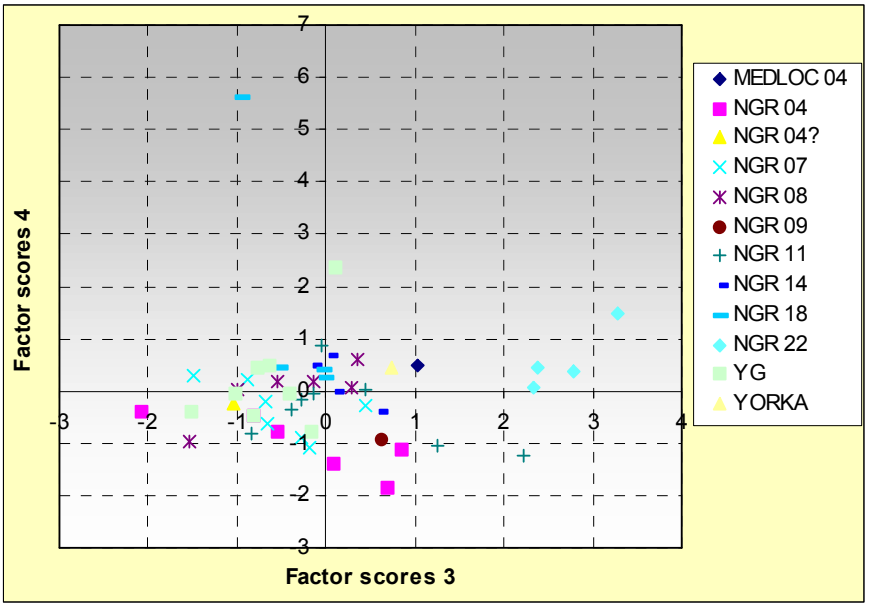

Figure 4

Factor Analysis of the Group A Wetherby samples, together with the comparative data indicates that there are five factors underlying the variation in the data.

A plot of F1 against F2 (Fig 5) indicates that the Baildon, Winksley, Knaresborough and Ripon samples all have lower F2 scores than the Wetherby samples but that the Thorner, Mirfield and Follifoot samples overlap with the Wetherby ones.

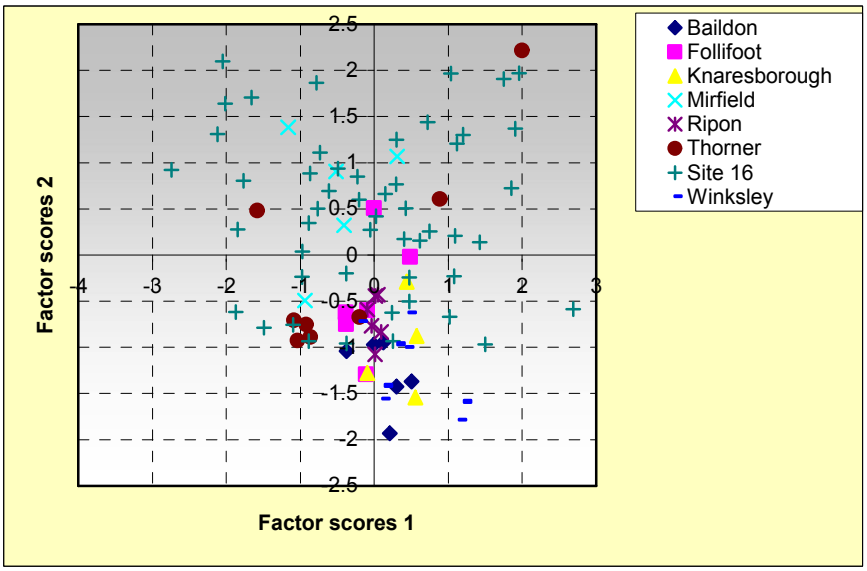

Figure 5

A plot of F3 against F4 confirms the difference between most of these comparative groups and the Winksley samples and also separates the Mirfield clay samples, the Follifoot and the Thorner samples (except for one Wetherby sample, the York A piece, which plots close to the Thorner samples).

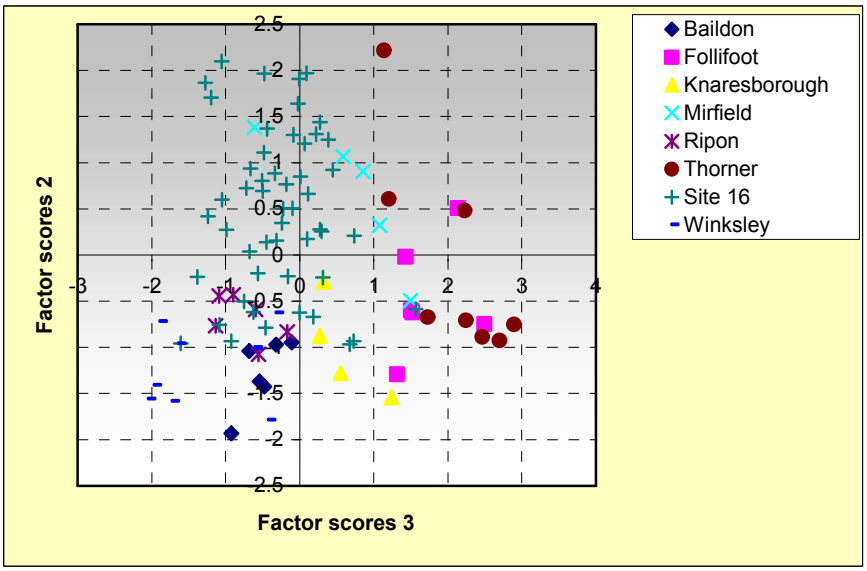

Figure 6

Four Wetherby samples (NGR 9 and NGR 22) plot away from the remainder and fall between the Ripon and Winksley samples. The remainder form a large cluster with no signs of internal patterning. This suggests that, when compared with material from the comparative sites, the variation between the YG samples and the NGR ones is less, and indeed it is impossible using these two factors to separate the two groups. The F5 scores add no new detail, although confirming the similarity of the York A sample to the Thorner material.

The variation in composition, as measured by their factor analysis scores, is actually about twice as great within the Wetherby samples as it is within the comparative samples (except where distinctive fabrics were being produced, as at Winksley) and this might indicate that the raw materials used by a single production site supplying the Wetherby site were very variable or that several different production sites, mainly producing wares more similar to each other than to the comparanda, were supplying the site. The fact that with a few exceptions the recognised subfabrics do not form distinct chemical composition groups may favour the first model. These exceptions are NGR 9 and NGR 22, both of which have F3 and F4 scores which show similarity in chemical composition to the products of the Winksley/Lumley Farm industry. However, the F2 scores for these two groups are different from each other, and different from the Winksley and Lumley Farm samples. There is only one sample of NGR 9 but there are four samples of NGR 22, which always have factor

scores which are similar to each other. Here, then, is a group of pottery from the Wetherby site which is both petrologically and chemically distinct. As we have seen, this group is also distinguishable when examining just the Wetherby Group A samples.

Group B

Factor analysis of the Wetherby Group B samples reveals five factors. A plot of F1 against F2 scores shows that, as in Group A, most of the samples form a single, large cluster. The F1 scores show no differentiation of the fabric groups but the F2 scores separate NGR 22 from the remainder (Fig 7).

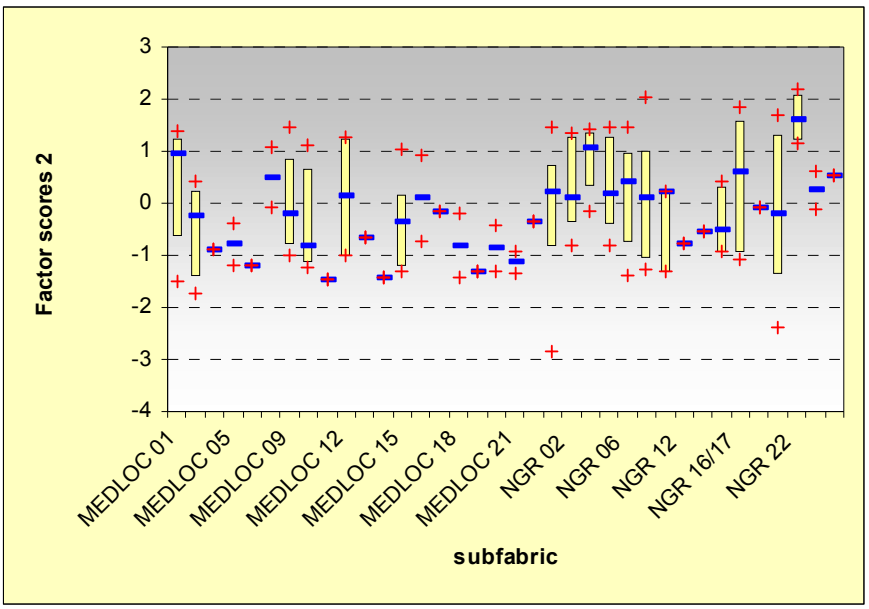

Figure 7

The F3 scores also distinguish NGR 22 as well as indicating differences in range and mean for some of the other groups (although they mainly overlap). The F4 scores likewise distinguish NGR 22 and indicate some patterning within the main cluster (e.g. NGR 20 samples have higher than average F4 scores whilst NGR 1 samples have lower ones).

The F5 scores similarly show higher than average scores for NGR 22 and NGR 20 and lower than average scores for F3.

In summary, the factor analysis for the Group B samples again shows NGR 22 as being different in composition to the remainder whilst there is a general similarity in composition of the remaining samples. Interestingly, there is very little difference in chemical composition between the NGR samples and the sandier MEDLOC ones. This suggests that the MEDLOC fabrics are made from the same raw materials as the NGR ones and that the visual difference is due to the selection or creation of fabrics of particular texture.

The second factor analysis of Group B samples, including the comparative samples, also revealed five factors. Neither F1 nor F2 scores could separate the Wetherby from the comparative samples but a plot of F3 against F4 scores shows that the F4 scores separate the Mirfield, Thorner, and Follifoot samples from the remainder. The Baildon and Lumley Farm samples have negative F3 scores, but neutral F4 scores, overlapping with a number of the Wetherby fabrics, whilst the Winksley samples have similar negative F3 scores but have negative F4 scores which distinguish them from the Wetherby samples. However, even where the Baildon and Lumley Farm scores overlap with those of Wetherby samples, those samples belong to fabric groups whose mean F3 scores are higher (Fig 8). Only the comparanda from Knaresborough are indistinguishable from the Wetherby samples.

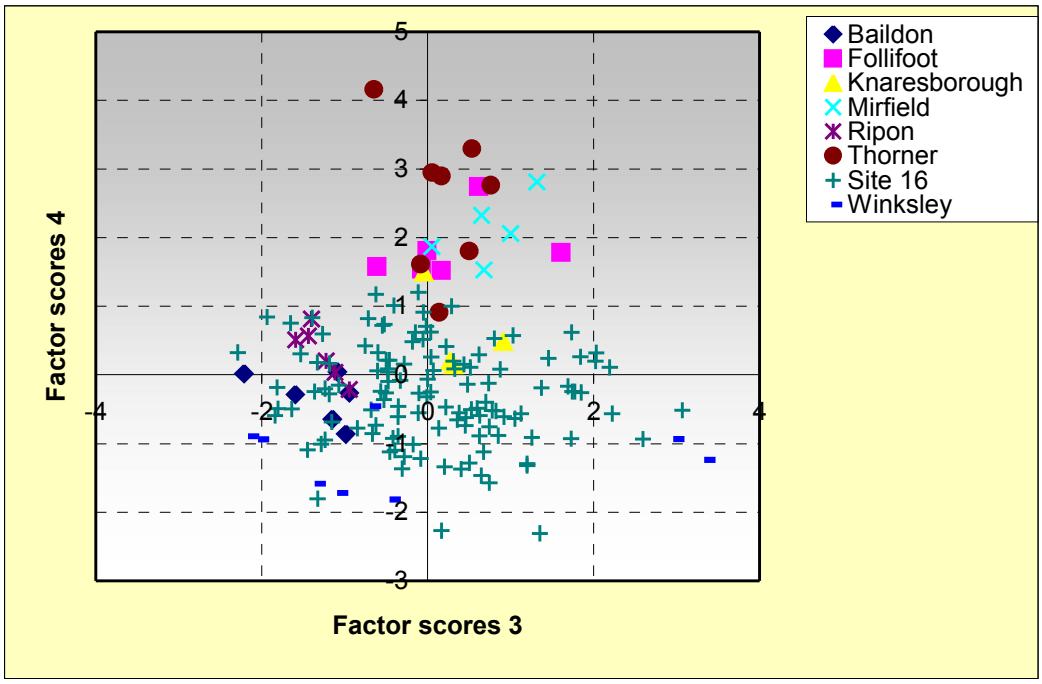

Figure 8

Factor 5 scores distinguish the Lumley Farm and Winksley samples from the majority of the Wetherby ones, in both cases by their higher F5 scores, as well as distinguishing the Mirfield samples from the Thorner and Follifoot samples. A few Wetherby samples also have high F5 scores, namely, MEDLOC 5, MEDLOC 14, NGR 22 and NGR 20.

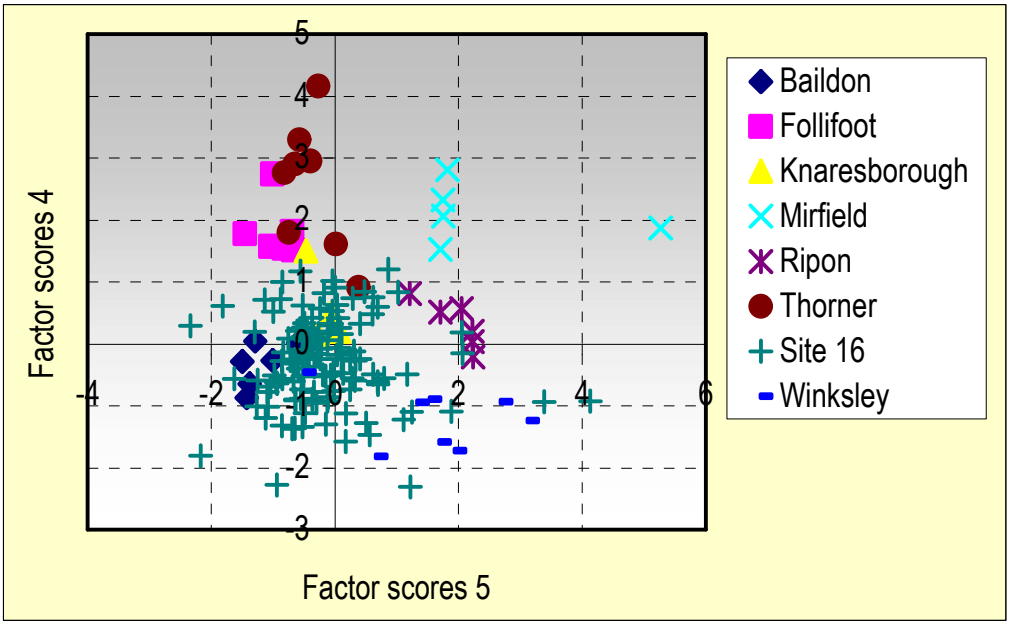

Figure 9

In summary, the comparison of the Group B samples with local comparanda indicates low similarity with the Follifoot and Mirfield samples, closer similarity with the Winksley and Lumley farm samples, which can nevertheless still be distinguished from the Wetherby fabrics and a close comparison between the Baildon and Knaresborough samples. In the latter case there is no differentiation between the Wetherby samples at all, although only two samples have similar scores to the Knaresborough samples for all five factors (V2696, MEDLOC 18, and V2683, MEDLOC 4). It is therefore likely that some of the Wetherby fabrics were made from the same raw materials as those used in the Knaresborough samples but that the remainder were made at other, unsampled, sources (with the possible exception of Baildon).

Group C

Factor analysis of the Group C Wetherby samples revealed five factors. A plot of F1 against F2 (Fig 10) indicates that F1 distinguishes the three NGR 15 samples from the remainder, which show no clear signs of patterning, either in their F1 or F2 scores. The F3 and F4 scores also show no patterning whilst the F5 scores separate MEDLOC 22 from the remainder.

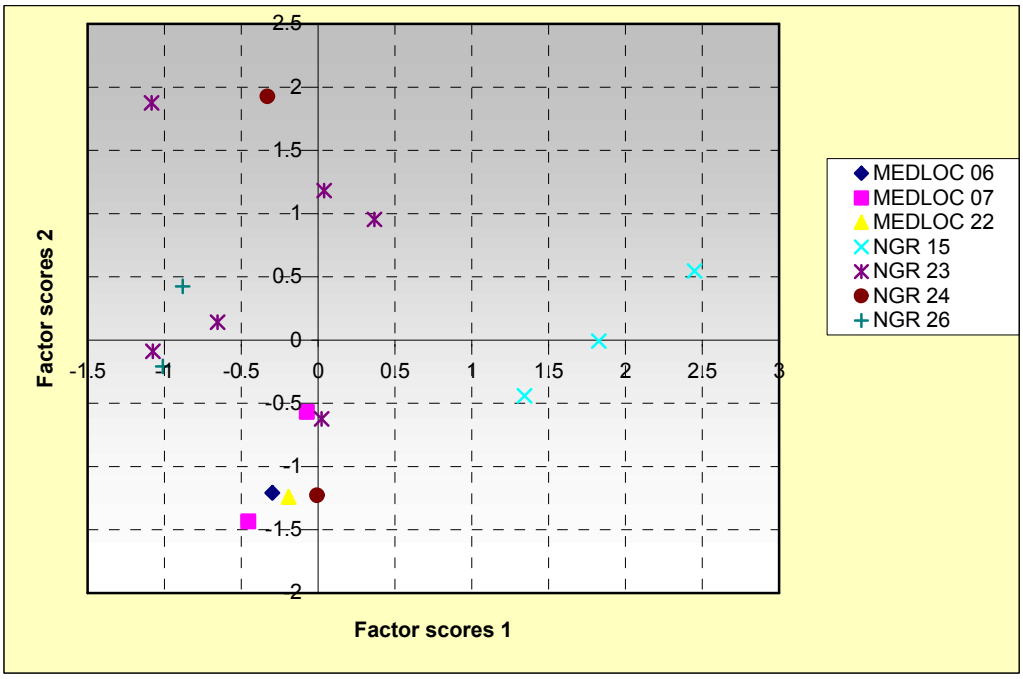

Figure 10

Factor analysis of the Group C samples together with the comparanda revealed six factors.

A plot of F1 against F2 shows that the F2 scores separate the Thorner and Follifoot samples from the remainder (Fig 11).

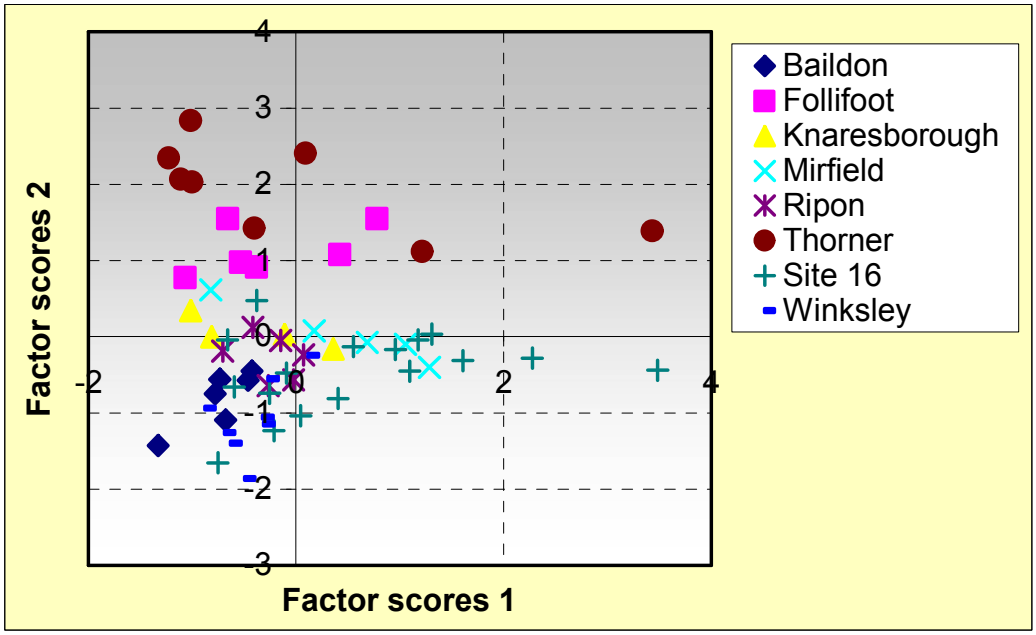

Figure 11

A plot of F3 against F4 separates the Mirfield, Winksley and Lumley Farm samples from the remainder (Fig 12) whilst a plot of F5 against F6 scores again separates the Mirfield, Winksley and Lumley Farm samples whilst also separating the Baildon samples (Fig 13).

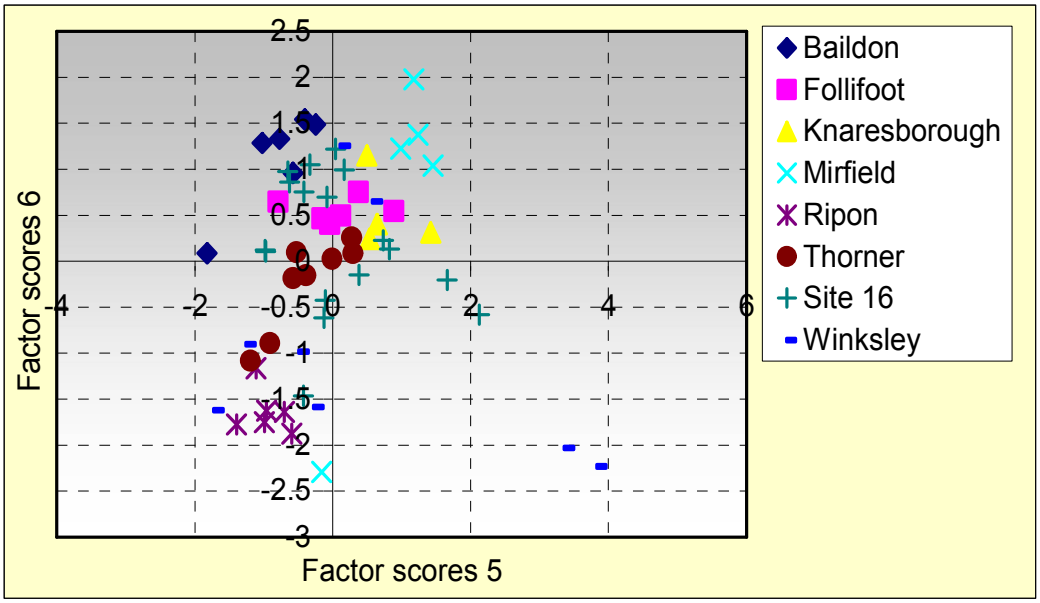

Figure 12

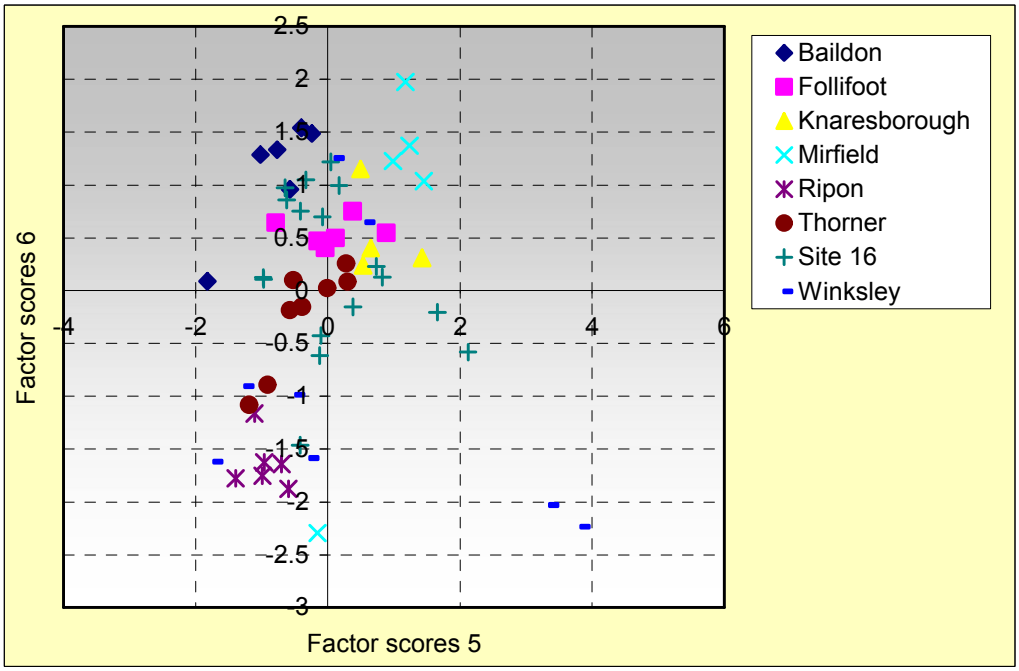

Figure 13

In summary, the factor analysis of the Group C samples together with local comparanda indicates that the Wetherby samples can be distinguished with various degrees of facility from those from Baildon, Follifoot, Mirfield, Lumley Farm, Thorner and Winksley. Of these,

the Baildon samples are closest in composition to the Wetherby ones. However, there is no clear difference between the composition of the Wetherby samples and those from Knaresborough.

Chronological Trends

A final factor analysis was made of all the locally-produced pottery samples from Wetherby, including the YG and York A sherds. This analysis revealed four factors. A plot of F1 against F2 scores (Fig 14) indicates no clear trend nor is one visible in a plot of F3 against F4 scores. There are more samples of Group B with negative F2 scores than there are of Groups A or C, but then there are considerably more samples in this group anyway.

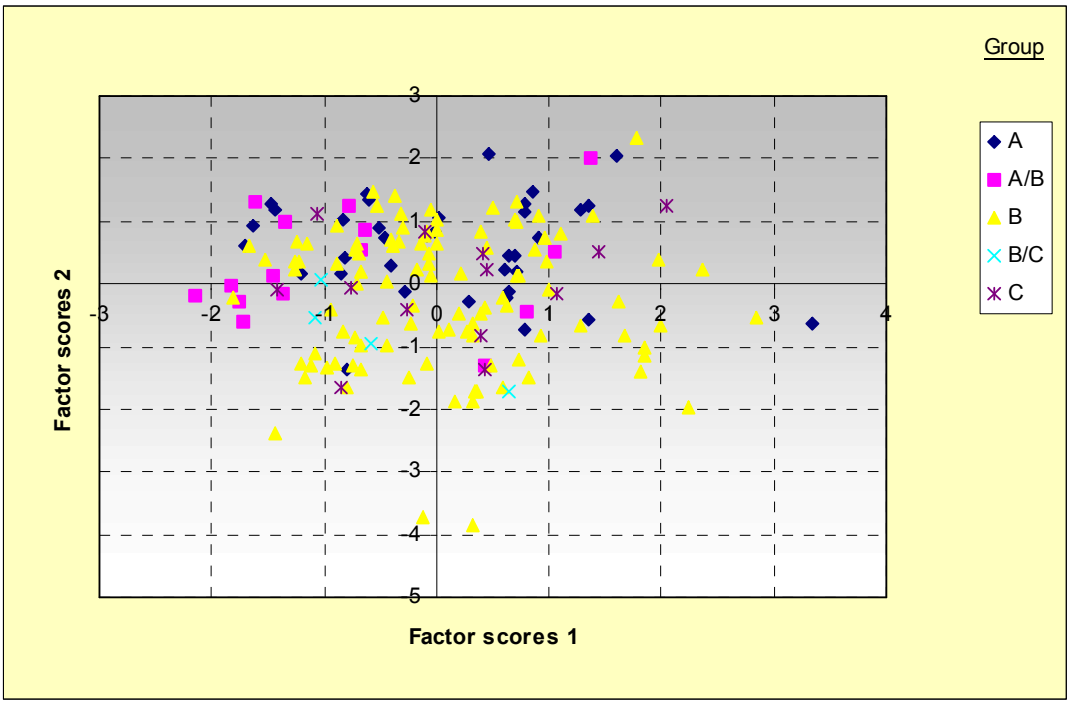

Figure 14

It seems, therefore, that the same raw materials were being exploited throughout the medieval period, albeit probably at more than one location.

Conclusions

Taking the petrological and chemical evidence together, it seems likely that the same raw materials were used to make most of the YG, MEDLOC and NGR used on the site. The exceptions account for very few samples, most of which were “one-offs” rather than representative of a major component of the medieval pottery on the site.

The similarity of the York Gritty ware to the other two fabric groups points to Potterton as a source for the Wetherby local wares, although this conclusion is entirely circumstantial:

a) Potterton is known from its place name to be producing pottery by the 1080s.

b) The only pottery dating to this period in York is of York Gritty ware.

c) Petrological and chemical analysis of samples of York Gritty ware from York (and Wetherby) indicate that it was produced from a light-firing mudstone, fragments of which survive in thin section as relict clay

d) Chemical analysis of the York Gritty ware indicates a high but fluctuating Barium content, which suggests that fragments of Baryte are present.

e) Barium is also present in enhanced quantities in samples of NGR fabrics 3 and 22 and YG from the Wetherby site.

f) There is no clear chemical distinction between the YG samples and the remainder nor between the samples of different period groups.

Appendices

Appendix 1

TSNO	Sitecode	Context	REFNO	cname	Form	Action	Description	subfabric
V2703	WW/16C/03	32		MEDLOC	JUG	TS;ICPS	EXT CUGL	FABRIC 09
V2747	WW/16C/03	31	DR61	NGR	JUG	TS;ICPS	THICK WHITE SLIP CF TVW	FABRIC 06
V2749	WW/16C/03	32		NGR	JAR	TS;ICPS	THICK WHITE SLIP CF TVW;EVERTED RIM;GLOB BODY	FABRIC 06
V2750	WW/16C/03	23	DR03	NGR	JAR	TS;ICPS	UNGLAZED	FABRIC 11
V2753	WW/16C/03	779	DR11	NGR	JAR	TS;ICPS	UNGLAZED	FABRIC 04
V2755	WW/16C/03	1023	DR08	NGR	BOWL	TS;ICPS	UNGLAZED	FABRIC 04
V2741	WW/16C/03	5	DR04	NGR	JUG	TS;ICPS	EXT PURP GL;OVAL HANDLE;VITR	FABRIC 15
V2718	WW/16C/03	715		NGR		TS;ICPS		VITR
V2660	WW/16C/03	866		NGR	JUG	TS;ICPS	EXT PLAIN GL;SHL=V2661	FABRIC 06
V2702	WW/16C/03	279		MEDLOC	JUG	TS;ICPS	EXT CUGL	FABRIC 09
V2744	WW/16C/03	40	DR15	NGR	JAR	TS;ICPS	RED SLIP EXT;UNGLAZED	FABRIC 10
V2704	WW/16C/03	31		MEDLOC	JUG	TS;ICPS	EXT CUGL	FABRIC 09
V2705	WW/16C/03	203	DR00	MEDLOC	JUG	TS;ICPS	EXT PLAIN GL	FABRIC 11
V2706	WW/16C/03	715		MEDLOC	JUG	TS;ICPS	EXT PLAIN GL	FABRIC 12
V2734	WW/16C/03	45	SF2557	NGR	JAR, HANDLED	TS;ICPS	NO GLAZE REMAINING	FABRIC 19
V2713	WW/16C/03	1023		MEDLOC	JUG	TS;ICPS	EXT PLAIN GL	FABRIC 12
V2731	WW/16C/03	715		NGR	JAR/DRIP	TS;ICPS	INT PLAIN GL	FABRIC 23

TSNO	Sitecode	Context	REFNO	cname	Form	Action	Description	subfabric
V2719	WW/16C/03	239	SF2058	NGR		TS;ICPS		VITR
V2723	WW/16C/03	766		NGR	JAR	TS;ICPS	INT PLAIN GL	FABRIC 27
V2539	ww/16c/03	766		NGR	JAR	TS;ICPS		FABRIC 02
V2745	WW/16C/03	590	DR18	NGR	JUG	TS;ICPS	EXT PLAIN GL	FABRIC 09
V2595	ww/16c/03	1023		NGR	JAR	TS;ICPS	WHITE SLIPPED INT	FABRIC 01
V2586	ww/16c/03	1023	DR 09	NGR	JAR	TS;ICPS		FABRIC 18
V2594	ww/16c/03	568		NGR	JUG	TS;ICPS	RED SLIP EXT;PLAIN GLAZE DRIBBLES EXT	FABRIC 02
V2589	ww/16c/03	3		NGR	JAR	TS;ICPS		FABRIC 02
V2590	ww/16c/03	288	DR 23	NGR	JAR	TS;ICPS		FABRIC 02
V2591	ww/16c/03	23		NGR	JAR	TS;ICPS		FABRIC 02
V2592	ww/16c/03	1023		NGR	JAR	TS;ICPS	PLAIN GLAZE DRIBBLES INT	FABRIC 02
V2544	ww/16c/03	27		NGR	CLSD	TS;ICPS	PLAIN GLAZE DRIBBLES EXT	FABRIC 03
V2746	WW/16C/03	590	DR17	NGR	BOWL	TS;ICPS	UNGLAZED	FABRIC 08
V2547	ww/16c/03	288	DR 21	NGR	JAR	TS;ICPS		FABRIC 03
V2729	WW/16C/03	27		NGR	JUG	TS;ICPS	EXT PLAIN GL	FABRIC 20
V2735	WW/16C/03	590	VESS5	NGR	JAR	TS;ICPS	UNGLAZED;SHL=V2623	FABRIC 14
V2736	WW/16C/03	288	DR27	NGR	JAR	TS;ICPS	UNGLAZED	FABRIC 04
V2737	WW/16C/03	265		NGR	JUG	TS;ICPS	EXT PLAIN GL	FABRIC 05

TSNO	Sitecode	Context	REFNO	cname	Form	Action	Description	subfabric
V2738	WW/16C/03	263		NGR	JUG	TS;ICPS	EXT PLAIN GL;THIN EXT RED SLIP	FABRIC 16/17
V2739	WW/16C/03	262		NGR	PANC	TS;ICPS	INT PLAIN GL	FABRIC 16/17
V2740	WW/16C/03	1074		NGR	JUG	TS;ICPS	EXT RED SLIP;EXT PURP GL;VITR	FABRIC 15
V2696	WW/16C/03	32		MEDLOC	JUG	TS;ICPS		FABRIC 18
V2728	WW/16C/03	288		NGR	JUG	TS;ICPS	EXT PLAIN GL	FABRIC 21
V2700	WW/16C/03	472		MEDLOC	JUG	TS;ICPS	EXT PLAIN GL	FABRIC 21
V2664	WW/16C/03	013		NGR	JAR	TS;ICPS	UNGLAZED	FABRIC 04
V2726	WW/16C/03	32		NGR	JAR	TS;ICPS	UNGLAZED;EXT RED SLIP	FABRIC 08
V2611	WW/16C/03	589		NGR	JAR	TS;ICPS	UNGLAZED	FABRIC 20
V2667	WW/16C/03	763		NGR	JAR	TS;ICPS	EXT RED SLIP;EXT PLAIN GL	FABRIC 02
V2610	WW/16C/03	589		NGR	JAR	TS;ICPS	UNGLAZED	FABRIC 20
V2609	WW/16C/03	763		NGR	JAR	TS;ICPS	UNGLAZED	FABRIC 22
V2602	WW/16C/03	590		NGR	JAR	TS;ICPS	UNGLAZED	FABRIC 08
V2541	ww/16c/03	763		NGR	JAR	TS;ICPS		FABRIC 07
V2606	WW/16C/03	590		NGR	JAR/BOWL	TS;ICPS	SQUARED RIM	FABRIC 04
V2613	WW/16C/03	003		NGR	JUG	TS;ICPS	EXT PLAIN SPLASH GL	FABRIC 20
V2619	WW/16C/03	288		NGR	JAR	TS;ICPS	UNGLAZED	FABRIC 18
V2616	WW/16C/03	262		NGR	JAR	TS;ICPS	UNGLAZED	FABRIC 11

TSNO	Sitecode	Context	REFNO	cname	Form	Action	Description	subfabric
V2661	WW/16C/03	866		NGR	JUG	TS;ICPS	EXT WHITE SLIP;EXT PLAIN GL;SHL=V2660	FABRIC 06
V2634	WW/16C/03	787		NGR	PANC	TS;ICPS	RED SLIPPED INT AND EXT;PLAIN GL SPLASH INT	FABRIC 05
V2663	WW/16C/03	023		NGR	JUG	TS;ICPS	RSD SQUARE TOOTH;EXT CUGL	FABRIC 12
V2636	WW/16C/03	589		MEDLOC	JAR	TS;ICPS	RED SLIPPED INT AND EXT	FABRIC 02
V2666	WW/16C/03	027		MEDLOC	JUG	TS;ICPS	EXT PLAIN GL	FABRIC 02
V2637	WW/16C/03	590		MEDLOC	JUG	TS;ICPS	EXT PLAIN GL	FABRIC 02
V2659	WW/16C/03	288		NGR	JAR	TS;ICPS	UNGLAZED	FABRIC 18
V2638	WW/16C/03	288		MEDLOC	JUG	TS;ICPS	EXT RED SLIPPED;EXT PLAIN GL	FABRIC 02
V2605	WW/16C/03	763		NGR	JAR	TS;ICPS	ROLLED-OUT RIM	FABRIC 04?
V2647	WW/16C/03	515		MEDLOC	JUG	TS;ICPS	THICK EXT RED MARGIN - ADDED CLAY?	FABRIC 27
V2542	ww/16c/03	288		NGR	JAR	TS;ICPS		FABRIC 07
V2698	WW/16C/03	13		MEDLOC	JAR	TS;ICPS	UNGLAZED	FABRIC 10
V2712	WW/16C/03	589		MEDLOC	JUG	TS;ICPS		FABRIC 02
V2617	WW/16C/03	262		NGR	JAR	TS;ICPS	UNGLAZED	FABRIC 11
V2641	WW/16C/03	763		MEDLOC	JUG	TS;ICPS	EXT PLAIN GL	FABRIC 01
V2642	WW/16C/03	1023		MEDLOC	JUG	TS;ICPS	EXT PLAIN GL	FABRIC 01
V2643	WW/16C/03	589		MEDLOC	JUG?	TS;ICPS	EXT PLAIN GL	FABRIC 12
V2644	WW/16C/03	589		MEDLOC	JUG	TS;ICPS	EXT PLAIN GL	FABRIC 12

TSNO	Sitecode	Context	REFNO	cname	Form	Action	Description	subfabric
V2612	WW/16C/03	007		NGR	JUG	TS;ICPS	EXT PLAIN SPLASH GL	FABRIC 20
V2646	WW/16C/03	590		MEDLOC	JAR	TS;ICPS	UNGLAZED;SQUARED RIM	FABRIC 08
V2727	WW/16C/03	763		NGR	JAR	TS;ICPS	UNGLAZED	FABRIC 22
V2624	WW/16C/03	594		NGR	JAR	TS;ICPS	UNGLAZED	FABRIC 14
V2623	WW/16C/03	590		NGR	JAR	TS;ICPS	UNGLAZED;SHL=V2735	FABRIC 14
V2622	WW/16C/03	590		NGR	JAR	TS;ICPS	UNGLAZED	FABRIC 14
V2621	WW/16C/03	288		NGR	JAR	TS;ICPS	UNGLAZED	FABRIC 10
V2620	WW/16C/03	288		NGR	JAR	TS;ICPS	UNGLAZED	FABRIC 10
V2640	WW/16C/03	589		MEDLOC	JUG	TS;ICPS		FABRIC 01
V2618	WW/16C/03	288		NGR	JAR	TS;ICPS	UNGLAZED	FABRIC 18
V2645	WW/16C/03	568		MEDLOC	JUG	TS;ICPS		FABRIC 10
V2607	WW/16C/03	590		NGR	JAR	TS;ICPS	UNGLAZED	FABRIC 22
V2743	WW/16A/03	471	DR42	NGR	JAR	TS;ICPS	UNGLAZED	FABRIC 13
V2714	WW/16A/03	472		MEDLOC	JUG	TS;ICPS	EXT PLAIN GL	FABRIC 22
V2725	WW/16A/03	852	VESS10	NGR	JUG	TS;ICPS	EXT CUGL	FABRIC 24
V2724	WW/16A/03	8322	SF2297	NGR	JAR	TS;ICPS	UNGLAZED	FABRIC 08
V2721	WW/16A/03	472		NGR	JUG	TS;ICPS	EXT PLAIN GL	FABRIC 26
V2720	WW/16A/03	1295	VESS9	MEDLOC	JUG	TS;ICPS	EXT PLAIN GL	FABRIC 01

TSNO	Sitecode	Context	REFNO	cname	Form	Action	Description	subfabric
V2732	WW/16A/03	339		NGR	JAR	TS;ICPS	INT PLAIN GL	FABRIC 23
V2733	WW/16A/03	472		NGR	JAR	TS;ICPS	INT PLAIN GL	FABRIC 23
V2635	WW/16A/03	355		MEDLOC	JUG	TS;ICPS	EXT PLAIN GL	FABRIC 09
V2722	WW/16A/03	472		NGR	JUG	TS;ICPS	EXT PLAIN GL	FABRIC 26
V2711	WW/16A/03	472		MEDLOC	JUG	TS;ICPS	EXT PLAIN GL	FABRIC 20
V2710	WW/16A/03	472		MEDLOC	JUG	TS;ICPS	EXT PLAIN GL;THICK WHITE SLIP	FABRIC 20
V2709	WW/16A/03	840		MEDLOC	JUG	TS;ICPS	EXT PLAIN GL	FABRIC 15
V2708	WW/16A/03	606		MEDLOC	JUG	TS;ICPS	EXT PLAIN GL	FABRIC 15
V2707	WW/16A/03	472		MEDLOC	JUG	TS;ICPS	EXT PLAIN GL	FABRIC 19
V2648	WW/16A/03	847		MEDLOC	JUG	TS;ICPS	PLAIN EXT GL	FABRIC 09
V2649	WW/16A/03	606		MEDLOC	JUG	TS;ICPS	RED SLIP INT AND EXT	FABRIC 15
V2665	WW/16A/03	841		NGR	JUG	TS;ICPS	ROD HANDLE;EXT CUGL	FABRIC 06
V2639	WW/16A/03	852		MEDLOC	JUG	TS;ICPS	EXT PLAIN GL	FABRIC 10
V2546	ww/16c/03	594	DR 20	NGR	JAR	TS;ICPS	RED SLIP EXT	FABRIC 03
V2742	WW/16A/03	472		NGR	JUG	TS;ICPS	EXT RED SLIP;EXT PURP GL;VITR	FABRIC 15
V2695	WW/16A/03	472		MEDLOC	JUG	TS;ICPS	EXT RED SLIP DRIBBLES	FABRIC 18
V2656	WW/16A/03	893		NGR	JAR/BOWL	TS;ICPS	UNGLAZED	FABRIC 07
V2748	WW/16A/03	308	DR48	NGR	JUG	TS;ICPS	THICK WHITE SLIP CF TVW;EXT RED SLIP;EXT PLAIN GL	FABRIC 06

TSNO	Sitecode	Context	REFNO	cname	Form	Action	Description	subfabric
V2652	WW/16A/03	002		MEDLOC	JUG	TS;ICPS	EXT PLAIN GL;EXT RED SLIP	FABRIC 01
V2701	WW/16A/03	840		MEDLOC	JUG	TS;ICPS	EXT CUGL AND POSS RED SLIP;THICK WHITE SLIP	FABRIC 17
V2651	WW/16A/03	332		MEDLOC	JUG	TS;ICPS	INT AND EXT PLAIN GL;EXT RED SLIP	FABRIC 01
V2657	WW/16A/03	847		NGR	JUG	TS;ICPS	EXT RED SLIP;EXT PLAIN GL	FABRIC 07
V2658	WW/16A/03	846		NGR	JAR	TS;ICPS	EXT RED SLIP	FABRIC 08
V2752	WW/16A/03	498	DR44	NGR	JAR	TS;ICPS	PLAIN GL INSIDE EVERTED RIM	FABRIC 05
V2730	WW/16A/03	837		NGR	JAR, HANDLED	TS;ICPS	EXT RED SLIP;OVAL HANDLE	FABRIC 06
V2603	WW/16A/03	853		NGR	JAR	TS;ICPS	LID-SEATED	FABRIC 07
V2694	WW/16A/03	840		MEDLOC	JUG	TS;ICPS	EXT PLAIN GL	FABRIC 16
V2655	WW/16A/03	840		NGR	JUG	TS;ICPS	EXT PLAIN GL	FABRIC 05
V2754	WW/16A/03	498	DR45	NGR	JAR	TS;ICPS	SPOTS OF PLAIN GL EXT;PLAIN GL INT	FABRIC 11
V2654	WW/16A/03	840		NGR	JUG	TS;ICPS	EXT PLAIN GL	FABRIC 23
V2690	WW/16A/03	853		MEDLOC	JUG	TS;ICPS	EXT RED SLIP	FABRIC 15
V2691	WW/16A/03	472		MEDLOC	JUG	TS;ICPS	EXT PLAIN GL	FABRIC 16
V2692	WW/16A/03	472		MEDLOC	JUG	TS;ICPS	EXT PLAIN GL	FABRIC 15
V2693	WW/16A/03	840		MEDLOC	JUG	TS;ICPS	EXT PLAIN GL	FABRIC 15
V2699	WW/16A/03	472		MEDLOC	JUG	TS;ICPS	EXT PLAIN GL	FABRIC 21
V2751	WW/16A/03	853	DR39	NGR	JAR	TS;ICPS	RED SLIP INT AND EXT;EXT PLAIN/PURP	FABRIC 05

TSNO	Sitecode	Context	REFNO	cname	Form	Action	Description	subfabric
							GL	
V2683	WW/16C/03	787	DR13	MEDLOC		TS;ICPS		FABRIC 04
V2662	WW/16A/03	840		NGR	JUG	TS;ICPS	EXT CUGL	FABRIC 06
V2598	ww/16c/03	45		NGR	JAR	TS;ICPS	PLAIN GLAZE DRIBBLES EXT	FABRIC 01
V2599	ww/16c/03	263		NGR	JUG	TS;ICPS	WHITE SLIPPED EXT	FABRIC 01
V2600	ww/16c/03	591		NGR	JAR	TS;ICPS	CUGL? INT	FABRIC 01
V2626	WW/16C/03	263		NGR	JUG	TS;ICPS	EXT PLAIN GL	FABRIC 16/17
V2628	WW/16C/03	763		NGR	JAR	TS;ICPS	HANDLED;EXT PLAIN GL SPLASH	FABRIC 16/17
V2593	ww/16c/03	288		NGR	JAR	TS;ICPS		FABRIC 02
V2632	WW/16C/03	594		NGR	JAR	TS;ICPS	UNGLAZED	FABRIC 05
V2596	ww/16c/03	1023	DR 07	NGR	JAR	TS;ICPS		FABRIC 01
V2680	WW/16C/03	715		MEDLOC	JUG	TS;ICPS		FABRIC 02
V2631	WW/16C/03	598		NGR	JAR	TS;ICPS	UNGLAZED	FABRIC 04
V2684	WW/16C/03	40	DR16	MEDLOC	JUG	TS;ICPS	EXT PLAIN GL	FABRIC 06
V2688	WW/16C/03	40	DR14	MEDLOC	JUG	TS;ICPS	EXT PLAIN GL	FABRIC 07
V2627	WW/16C/03	003		NGR	JAR	TS;ICPS	UNGLAZED	FABRIC 11
V2588	ww/16c/03	766		NGR	JAR	TS;ICPS		FABRIC 03
V2440	ww/16c/03	262	SF0208	MEDLOC	JUG	TS;ICPS		FABRIC 05
V2538	ww/16c/03	3		NGR	JAR	TS;ICPS		FABRIC 08

TSNO	Sitecode	Context	REFNO	cname	Form	Action	Description	subfabric
V2540	ww/16c/03	288		NGR	JAR	TS;ICPS	SQUARED RIM	FABRIC 07
V2697	WW/16A/03	472		MEDLOC	JAR	TS;ICPS	UNGLAZED	FABRIC 10
V2678	WW/16C/03	23	DR01	MEDLOC	JUG	TS;ICPS	PLAIN EXT GL	FABRIC 02
V2681	WW/16A/03	472		MEDLOC	JUG	TS;ICPS		FABRIC 02
V2629	WW/16A/03	852		NGR	JUG	TS;ICPS	EXT RED SLIP;EXT PLAIN GL	FABRIC 11
V2756	WW/16A/03	376	DR46	NGR	JAR	TS;ICPS	UNGLAZED	FABRIC 11
V2689	WW/16A/03	471	DR41	MEDLOC	DRIP	TS;ICPS	INT PLAIN GL	FABRIC 08
V2545	ww/16A/03	374		NGR	JAR	TS;ICPS	RED SLIP INT AND EXT;PLAIN GLAZE DRIBBLES INT AND EXT	FABRIC 03
V2682	WW/16A/03	1	DR54	MEDLOC	JUG	TS;ICPS	EXT PLAIN GL	FABRIC 05
V2587	ww/16A/03	374		NGR	JAR	TS;ICPS	PLAIN GLAZE DRIBBLES INT AND EXT	FABRIC 03
V2625	WW/16A/03	853		NGR	JUG	TS;ICPS	EXT PLAIN GL	FABRIC 16/17
V2653	WW/16A/03	841		MEDLOC	JAR	TS;ICPS	UNGLAZED	FABRIC 01
V2597	ww/16c/03	288	DR 25	NGR	JAR	TS;ICPS		FABRIC 01
V2630	WW/16A/03	853		NGR	JAR/BOWL	TS;ICPS	INT PLAIN GL	FABRIC 11
V2543	ww/16c/03	288		NGR	JAR	TS;ICPS		FABRIC 07
V2604	WW/16A/03	852		NGR	JUG	TS;ICPS	BROWN STREAKED EXT GL	FABRIC 24
V2677	WW/16A/03	1289		MEDLOC	JUG	TS;ICPS	EXT GLAZE SPLASHES	FABRIC 01
V2679	WW/16A/03	472		MEDLOC	JUG	TS;ICPS	EXT GLAZE SPLASHES	FABRIC 01

TSNO	Sitecode	Context	REFNO	cname	Form	Action	Description	subfabric
V2687	WW/16A/03	472	DR00	MEDLOC	JUG	TS;ICPS	EXT PLAIN GL SPLASHES	FABRIC 07
V2608	WW/16A/03	339		NGR	JAR	TS;ICPS	UNGLAZED	FABRIC 22
V2686	WW/16A/03	308		MEDLOC	JUG	TS;ICPS	EXT PLAIN GL	FABRIC 14
V2615	WW/16A/03	818		NGR	BOWL/JAR	TS;ICPS	INT GL	FABRIC 23
V2685	WW/16A/03	328		MEDLOC	JUG	TS;ICPS	EXT PLAIN GL	FABRIC 13
V2614	WW/16A/03	308		NGR	BOWL/JAR	TS;ICPS	INT GL	FABRIC 23

Appendix 2

cname	fabric	mudstones	groundmass	grit composition	sandstones
MEDLOC	?	none	light-firing;a aq <0.1mm	aq;saq;felspar(microcline;microperthite)	siltstones
MEDLOC	FABRIC 01	dark brown inclusionless (overfired, vesicular);white;opaque	light brown variegated;s aq;isotropic	aq;feldspar(plagioclase)	fine red sst
MEDLOC	FABRIC 02	dark brown inclusionless	light brown variegated;s aq <0.2mm	aq;feldspar(plagioclase)	med sst
MEDLOC	FABRIC 04	dark brown inclusionless	dark brown s aq<0.1mm	aq	fine red sst
MEDLOC	FABRIC 05	dark brown inclusionless	light-firing/light brown variegated;m aq	aq	fine red sst
MEDLOC	FABRIC 05	white inclusionless;white saq <0.2mm	light-firing a aq <0.2mm	aq	siltstone/fine sst;fine sst
MEDLOC	FABRIC 06	dark brown inclusionless	light-firing inclusionless	aq	fine sst;med sst
MEDLOC	FABRIC 07	dark brown inclusionless (vesicular where overfired);white inclusionless >white saq <0.2mm	light-firing s aq <0.1mm	aq	sstmg;med red sst
MEDLOC	FABRIC 08	dark brown inclusionless	light brown variegated; s aq <0.2mm	aq;feldspar(altered)	med sst
MEDLOC	FABRIC 09	Dark brown inclusionless;white inclusionless > white saq <0.2mm	light brown variegated	aq;feldspar(plagioclase;microperthite);rq	med sst
MEDLOC	FABRIC 10	dark brown inclusionless;white inclusionless;dark brown s aq <0.2mm	Light brown variegated s saq <0.2mm	aq;musc;feldspar(perthite)	med red sst;sstmg
MEDLOC	FABRIC	dark brown s aq <0.2mm	Light brown variegated s	aq;feldspar(microcline;plagioclase;perthite)	sstmg

cname	fabric	mudstones	groundmass	grit composition	sandstones
	11		saq <0.2mm		
MEDLOC	FABRIC 12	dark brown inclusionless (vesicular where overfired)	Light brown variegated a saq <0.2mm	aq;feldspar(plagioclase;perthite);musc	med red sst
MEDLOC	FABRIC 13	dark brown saq and musc <0.1mm	Light brown variegated; a saq and musc <0.2mm	aq;feldspar(plagioclase;perthite)	med red sst
MEDLOC	FABRIC 14	white m saq <0.2mm	Light brown/light-firing variegated;m aq <0.2mm	sa q <0.3mm	none
MEDLOC	FABRIC 15	dark brown inclusionless;dark brown/white inclusionless	Light brown variegated s saq <0.2mm	aq;feldspar(plagioclase)	med red sst
MEDLOC	FABRIC 16	dark brown/white s aq <0.2mm	Light brown variegated s saq <0.2mm;white slip a aq <0.1mm	aq;feldspar(plagioclase)	med red sst;sstmg
MEDLOC	FABRIC 17	Dark brown inclusionless (vesicular where overfired)	Light brown/light-firing varigated;s aq <0.2mm;white slip a saq <0.2mm	aq	med red sst
MEDLOC	FABRIC 18	Dark brown inclusionless	Light brown variegated a saq <0.1mm	aq	sstmg
MEDLOC	FABRIC 19	white inclusionless > s aq <0.2mm; dark brown inclusionless	light brown variegated s aq <0.2mm	aq; feldspar (microperthite)	med sst
MEDLOC	FABRIC 20	dark brown inclusionless (vesicular where overfired);white inclusionless >white saq <0.2mm	Light brown variegated m saq <0.2mm	aq	med sst
MEDLOC	FABRIC 21	dark brown saq and musc <0.1mm	Light brown variegated a saq and musc <0.1mm	aq;feldspar(plagioclase)	fine sst;med sst
MEDLOC	FABRIC	dark brown/white inclusionless	light brown variegated s	rq;r chert;r siltstone <0.3mm	none

cname	fabric	mudstones	groundmass	grit composition	sandstones
	22		aq <0.2mm		
MEDLOC	FABRIC 27	none	light brown variegated;sparse q silt	aq;musc	sstmg;fine sst
NGR	FABRIC 01	dark brown inclusionless	dark brown variegated;s q	aq;feldspar (plag;miscrocline)	med sst red cement
NGR	FABRIC 02	dark brown inclusionless	light to dark brown variegated inclusionless	aq	sstmg
NGR	FABRIC 02	organic	light to dark brown variegated inclusionless	aq	sstmg
NGR	FABRIC 03	some organic;some dark brown;s aq	light-firing/light brown variegated;m aq	aq	red cement medium-grained;sstmg
NGR	FABRIC 04	a dark brown inclusionless, white-firing inclusionless c.0.2mm to 1.0mm	light brown variegated;s saq	aq;feldspar (altered;perthite)	sstmg;fine sst
NGR	FABRIC 05	s alternating light and dark grey, strong bedding;dark brown inclusionless (opaque vesicular when reduced);white inclusionless	light brown variegated;fs	aq;feldspar (perthite)	sstmg
NGR	FABRIC 06	light-brown inclusionless	light-firing inclusionless;s saq <0.2mm;white slip contains a saq <0.2mm	aq;feldspar (plagioclase)	sstmg
NGR	FABRIC 07	dark brown inclusionless	dark brown;sparse aq <0.1mm	aq;feldspar (altered plag)	sstmg;fine sst
NGR	FABRIC 08	dark brown inclusionless;white inclusionless	light brown inclusionless	aq;feldspar(plagioclase;perthite)	sstmg
NGR	FABRIC	white m aq <0.2mm	light-firing;a saq;musc	AQ;feldspar (PLAG;PERTHITE)	SSTMG

cname	fabric	mudstones	groundmass	grit composition	sandstones
	09				
NGR	FABRIC 10	dark brown inclusionless;white inclusionless	light brown inclusionless	aq;feldspar(plagioclase;perthite)	sstmg
NGR	FABRIC 11	dark brown inclusionless;white inclusionless	light brown variegated;s saq	aq;feldspar(altered)	sstmg;med red sst
NGR	FABRIC 12	dark brown s aq	dark brown variegated;s q	aq	SSTMG
NGR	FABRIC 13	dark brown inclusionless;dark brown fine sandy	light brown;v sparse saq	aq;feldspar;musc flakes	sstmg
NGR	FABRIC 14	dark brown inclusionless;white inclusionless	light brown variegated;s aq	aq;feldspar(perthite)	sstmg;med red sst
NGR	FABRIC 15	dark brown inclusionless;white inclusionless	dark brown;sparse aq <0.1mm;lenses of white silty	aq	sstmg;fine sst
NGR	FABRIC 16/17	white inclusionless;organic;dark brown inclusionless	light brown;sparse saq	aq;feldspar (plag)	sstmg;fine sst
NGR	FABRIC 18	dark brown inclusionless	dark brown inclusionless	aq;feldspar(microcline;perthite)	sstmg;med red sst
NGR	FABRIC 19	dark brown inclusionless;dark brown fine sandy (well rounded, detrital)	dark brown inclusionless;s saq <0.2mm	aq;feldspar(plagioclase;perthite;altered);granite	med red sst;sstmg
NGR	FABRIC 20	dark brown inclusionless;white m aq <0.2mm	light bodied;m aq <0.2mm	aq;feldspar(plagioclase)	med sst
NGR	FABRIC 21	dark brown inclusionless;white inclusionless	variegated light-firing and light brown;inclusionless	aq;feldspar(plagioclase)	med sst
NGR	FABRIC	sparse light brown silty micaceous	light brown with a aq &	aq;baryte	sstmg;fine sst

cname	fabric	mudstones	groundmass	grit composition	sandstones
	22		musc <0.2mm		
NGR	FABRIC 23	dark brown inclusionless;white inclusionless	light-firing/light brown variegated;m aq	aq;feldspar(perthite)	sstmg;fine sst
NGR	FABRIC 24	dark brown inclusionless	light brown variegated	aq	sstmg;fine sst
NGR	FABRIC 26	alternating light and dark grey, strong bedding	light-firing;s saq <0.2mm	aq;feldspar (altered;microcline;plagioclase)	sstmg
NGR	FABRIC 27	dark brown s aq	light brown variegated;sparse q silt	aq;musc	sstmg;fine sst
NGR	VITR	none	light brown variegated;isotropic	aq	sstmg;fine sst
YG	-	dark brown inclusionless;white inclusionless	light brown;v sparse saq	aq; feldspar (plagioclase;microcline)	sstmg

Appendix 3

TSNO	Al2O3	Fe2O3	MgO	CaO	Na2O	K2O	TiO2	P2O5	MnO
V2440	21.69	7.94	1.1	0.23	0.27	2.28	0.81	0.24	0.02
V2538	27.01	8.71	0.88	0.38	0.1235	2.15	0.92	0.54	0.041
V2539	22.39	6.76	1.08	0.71	0.1425	1.77	0.73	0.69	0.192
V2540	24.66	6.69	1.01	0.55	0.133	2.45	0.82	0.68	0.062
V2541	26.04	6.66	0.92	0.5	0.114	2.08	0.86	0.43	0.096
V2542	17.8	5.07	0.77	0.28	0.2375	1.69	0.64	0.42	0.023
V2543	18.65	6.82	0.84	0.43	0.3705	1.82	0.71	1.52	0.081
V2544	21.64	5.82	1.15	0.22	0.3895	2.12	0.8	0.23	0.022
V2545	20.96	5.45	0.77	0.23	0.247	1.35	0.71	0.25	0.016
V2546	19.97	6.32	1.19	0.21	0.304	2.13	0.69	0.19	0.04
V2547	21.22	5.15	0.96	0.21	0.266	2.37	0.76	0.21	0.024
V2586	19.47	5.06	0.88	0.29	0.3325	1.44	0.68	0.09	0.259
V2587	18.26	5.52	1.02	0.49	0.38	2.4	0.73	0.18	0.061
V2588	21.44	6.12	0.7	0.19	0.247	1.9	0.76	0.42	0.021
V2589	24.11	5.41	0.89	0.37	0.114	2.28	0.8	0.93	0.026
V2590	21.75	6.48	0.69	0.16	0.209	1.81	0.77	0.51	0.012
V2591	20.48	5.98	0.69	0.17	0.247	1.62	0.7	0.38	0.017
V2592	19.29	5.42	0.74	0.15	0.2755	1.76	0.68	0.27	0.017
V2593	20.94	5.94	0.64	0.19	0.2185	1.77	0.74	0.48	0.014
V2594	20.09	5.56	0.73	0.12	0.171	1.52	0.7	0.16	0.007
V2595	19.76	5.86	0.76	0.19	0.323	1.6	0.76	0.21	0.011
V2596	16.08	6.85	0.63	0.23	0.2565	1.33	0.59	0.4	0.047
V2597	19.91	6.92	0.72	0.24	0.171	1.15	0.69	0.42	0.064
V2598	18.79	5.45	0.96	0.17	0.2755	2.06	0.73	0.44	0.027
V2599	22.75	6.82	0.81	0.33	0.361	1.79	0.79	0.64	0.088
V2600	20.19	7.73	0.89	0.28	0.285	2.12	0.73	0.61	0.052
V2602	25.89	5.39	1	0.41	0.1674	2.299	0.79	0.29	0.022
V2603	26.81	5.2	0.9	0.45	0.1209	1.786	0.87	0.48	0.027
V2604	19.66	5.42	1.03	0.35	0.186	1.6435	0.74	0.15	0.056
V2605	22.94	5.9	0.8	0.37	0.0837	1.482	0.78	0.18	0.039
V2606	24.22	5.65	1.15	0.48	0.1674	2.432	0.81	0.26	0.016
V2607	22.66	3.46	0.8	0.38	0.2139	2.261	0.97	0.27	0.017
V2608	19.59	6.43	0.88	0.52	0.5115	2.2705	0.8	0.55	0.061

TSNO	Al2O3	Fe2O3	MgO	CaO	Na2O	K2O	TiO2	P2O5	MnO
V2609	21.53	2.74	0.54	0.37	0.2139	2.223	0.92	0.74	0.063
V2610	18.63	5.03	1.24	0.26	0.3069	1.9285	0.68	0.26	0.024
V2611	24.06	3.91	0.45	0.17	0.186	0.9975	1.03	0.2	0.018
V2612	21.69	7.96	1	0.23	0.372	2.1945	0.84	0.39	0.017
V2613	21.64	4.98	0.98	0.23	0.2046	1.729	0.79	0.18	0.044
V2614	22.49	5.64	1.29	0.26	0.279	2.2325	0.8	0.19	0.034
V2615	20.19	4.88	0.97	0.29	0.2511	1.8145	0.76	0.14	0.04
V2616	21.85	6.98	0.98	0.26	0.2139	2.204	0.73	0.24	0.043
V2617	21.89	7.18	0.98	0.25	0.2232	2.28	0.71	0.29	0.074
V2618	18.56	7.23	1	0.3	0.3999	1.9285	0.64	0.66	0.043
V2619	20.26	8.45	0.93	0.33	0.2976	1.7955	0.72	0.55	0.076
V2620	20.09	6.83	0.67	0.22	0.3162	1.558	0.71	0.58	0.054
V2621	21.02	7.28	0.73	0.23	0.2604	1.5865	0.75	0.51	0.031
V2622	25.85	6.68	0.97	0.21	0.2697	2.299	0.89	0.4	0.047
V2623	26.69	5.14	0.99	0.36	0.1302	2.4225	0.89	0.34	0.021
V2624	25.42	4.61	1.24	0.58	0.1581	2.3275	0.83	0.33	0.042
V2625	20.49	6.05	1.18	0.34	0.2697	1.9	0.75	0.25	0.039
V2626	19.82	4.94	1.22	0.31	0.4185	2.166	0.7	0.45	0.066
V2627	24.28	7.17	1.15	0.31	0.1302	2.1755	0.88	0.15	0.023
V2628	21.62	4.09	0.78	0.11	0.1395	1.4725	0.76	0.12	0.081
V2629	22.44	6.97	1	0.29	0.186	2.28	0.8	0.13	0.017
V2630	19.96	6.25	0.95	0.39	0.2976	1.8525	0.8	0.69	0.05
V2631	22.24	5.83	0.72	0.17	0.2697	1.843	0.79	0.44	0.013
V2632	20.2	6.72	0.85	0.28	0.2883	1.3775	0.67	0.27	0.028
V2634	20.98	5.67	0.83	0.17	0.2976	1.805	0.71	0.18	0.022
V2635	19.1	7.04	0.98	0.22	0.1953	1.9095	0.71	0.18	0.025
V2636	20.11	5.9	0.97	0.19	0.2604	1.8525	0.69	0.15	0.027
V2637	19.15	4.44	0.64	0.13	0.3627	1.4725	0.66	0.21	0.013
V2638	18.53	4.75	0.64	0.17	0.372	1.4155	0.65	0.38	0.051
V2639	18.27	5.7	0.89	0.53	0.2976	1.672	0.73	0.43	0.056
V2640	19.85	6.01	1.05	0.16	0.3255	2.128	0.74	0.17	0.011
V2641	20.85	5.27	0.93	0.16	0.3813	2.09	0.77	0.13	0.021
V2642	24.37	5.96	1.15	0.32	0.2511	2.033	0.92	0.18	0.035
V2643	20.35	5.54	1.07	0.37	0.5301	1.748	0.77	0.19	0.036
V2644	19.49	5.8	1.07	0.34	0.4929	1.6625	0.76	0.17	0.036

TSNO	Al2O3	Fe2O3	MgO	CaO	Na2O	K2O	TiO2	P2O5	MnO
V2645	21.36	7.47	0.98	0.2	0.3627	2.223	0.83	0.33	0.036
V2646	26.43	4.34	0.97	0.4	0.1116	2.394	0.84	0.31	0.011
V2647	21.58	5.83	1.05	0.18	0.2976	2.1565	0.83	0.26	0.028
V2648	20.69	5	1.19	0.29	0.3906	2.0045	0.78	0.26	0.081
V2649	24.25	7.49	1.03	0.31	0.1488	2.109	0.88	0.16	0.01
V2651	21.3	4.77	1.38	0.91	0.4836	2.4985	0.77	0.31	0.06
V2652	22.12	5.7	0.79	0.17	0.279	1.7765	0.77	0.12	0.02
V2653	26.91	7.19	1.17	0.2	0.3627	2.5175	0.96	0.12	0.011
V2654	25.93	5.07	0.88	0.21	0.2139	2.3085	0.91	0.33	0.012
V2655	23.17	5.66	1.02	0.39	0.2883	2.147	0.82	0.44	0.029
V2656	24.44	5.6	1.08	0.78	0.0837	2.071	0.85	0.48	0.056
V2657	21.24	5.67	0.84	0.33	0.2046	1.463	0.75	0.45	0.022
V2658	21.96	6.43	1.02	0.55	0.1674	2.47	0.77	0.45	0.085
V2659	19.88	9.36	0.84	0.4	0.2418	1.729	0.72	0.72	0.093
V2660	21.07	5.72	1.01	0.33	0.2976	2.0615	0.78	0.33	0.026
V2661	20.63	5.98	0.76	0.22	0.2325	1.615	0.78	0.67	0.034
V2662	25.67	5.04	0.85	0.18	0.279	2.1755	0.89	0.23	0.017
V2663	22.29	7.78	0.75	0.25	0.186	1.311	0.72	0.45	0.05
V2664	24.25	6.53	0.99	0.42	0.1023	1.881	0.82	0.36	0.031
V2665	23.38	5.02	0.8	0.19	0.2139	1.9665	0.83	0.33	0.012
V2666	22.05	5.54	0.86	0.23	0.2325	1.5675	0.87	0.37	0.038
V2667	20.59	5.19	0.61	0.29	0.3255	1.7765	0.71	0.4	0.077
V2677	21.89	5.01	0.73	0.1	0.14	1.56	0.8	0.11	0.013
V2678	19.79	4.81	0.65	0.19	0.4	1.53	0.69	0.28	0.02
V2679	19.66	5.8	0.83	0.18	0.27	2.29	0.88	0.12	0.01
V2680	15.7	5.23	0.67	0.28	0.48	1.34	0.63	0.5	0.044
V2681	19.49	5.19	1.01	0.35	0.41	1.38	0.74	0.19	0.031
V2682	20.41	2.68	0.67	0.35	0.14	1.59	1.16	0.17	0.008
V2683	21.56	5.84	1.1	0.17	0.44	2.21	0.84	0.22	0.036
V2684	26.15	7.27	1.02	0.16	0.12	2.29	0.87	0.3	0.017
V2685	19.56	9.27	1.42	0.79	0.42	2.15	0.74	1.24	0.103
V2686	20.37	4.09	0.75	0.41	0.18	1.76	1.16	0.12	0.013
V2687	20.65	6.37	0.77	0.69	0.52	2.07	0.76	1.07	0.057
V2688	20.77	3.92	0.65	0.12	0.17	1.48	0.84	0.16	0.035
V2689	18.25	6.12	0.79	0.83	0.36	1.63	0.7	1.22	0.052

TSNO	Al2O3	Fe2O3	MgO	CaO	Na2O	K2O	TiO2	P2O5	MnO
V2690	19.75	6.49	1.15	0.41	0.5	2.29	0.79	0.2	0.079
V2691	21.6	5.86	0.75	0.37	0.35	1.9	0.79	0.6	0.021
V2692	21.93	5.35	0.8	0.14	0.39	1.95	0.77	0.21	0.019
V2693	22.82	6.16	1.03	0.18	0.35	2.24	0.86	0.12	0.017
V2694	22.59	5.18	0.98	0.33	0.43	1.99	0.84	0.39	0.027
V2695	22.27	6.8	1.08	0.2	0.31	2.39	0.86	0.25	0.016
V2696	21.56	8.82	0.85	0.22	0.15	2.24	0.9	0.28	0.02
V2697	20.07	6.36	0.75	0.52	0.31	1.97	0.74	0.51	0.067
V2698	20.09	5.59	0.54	0.2	0.25	1.55	0.75	0.95	0.141
V2699	22.08	6.96	1.1	0.3	0.24	2.04	0.84	0.28	0.034
V2700	18.27	6.27	1.4	0.42	0.43	2.03	0.75	0.17	0.064
V2701	21.14	4.08	0.71	0.16	0.36	1.89	0.76	0.16	0.013
V2702	18.42	4.45	0.97	0.37	0.51	1.44	0.72	0.25	0.048
V2703	19.29	7.63	1.07	0.44	0.43	1.53	0.79	0.28	0.06
V2704	18.67	6.04	1.25	0.39	0.42	1.57	0.77	0.13	0.055
V2705	18.5	5.89	1.15	0.32	0.38	1.85	0.68	0.25	0.045
V2706	18.89	4.6	0.66	0.12	0.24	1.49	0.77	0.14	0.03
V2707	21.43	6.93	1.05	0.2	0.2	2.3	0.83	0.21	0.025
V2708	22.3	6.27	1.05	0.26	0.42	2.2	0.84	0.55	0.03
V2709	21.4	5.9	1.06	0.39	0.35	2.09	0.83	0.18	0.029
V2710	21.56	6.82	1.05	0.19	0.24	2.43	0.85	0.19	0.012
V2711	22.09	6.12	1.04	0.21	0.32	2.19	0.79	0.15	0.023
V2712	20.45	4.8	0.58	0.14	0.4	1.6	0.76	0.54	0.012
V2713	21.66	4.54	0.7	0.11	0.17	1.48	0.84	0.15	0.019
V2714	23.14	5.21	1.27	1.16	0.18	2.93	0.99	0.36	0.014
V2718	22.21	7.63	0.95	0.2	0.4	2.34	0.81	0.08	0.019
V2719	22.33	7.03	0.9	0.2	0.4	2.33	0.82	0.09	0.023
V2720	22.87	6.04	0.72	0.14	0.16	1.66	0.83	0.13	0.011
V2721	23.16	4.59	0.8	0.12	0.2	2.04	0.81	0.24	0.014
V2722	20.84	4.18	0.69	0.12	0.2	1.95	0.72	0.19	0.007
V2723	17.99	6.58	1.3	0.3	0.24	2.23	0.65	0.13	0.086
V2724	28.77	7.02	0.85	0.35	0.24	2.53	0.91	0.19	0.025
V2725	18.22	5.69	1.02	0.25	0.26	1.73	0.69	0.18	0.026
V2726	19.66	6.19	0.86	0.2	0.34	1.54	0.76	0.12	0.045
V2727	18.59	3.56	0.54	0.3	0.27	2.09	0.73	0.51	0.066

TSNO	Al2O3	Fe2O3	MgO	CaO	Na2O	K2O	TiO2	P2O5	MnO
V2728	22.69	7.78	0.65	0.26	0.4	1.81	0.81	1.56	0.073
V2729	24.11	4.47	0.71	0.11	0.13	1.6	0.98	0.28	0.059
V2730	22.4	5.25	0.77	0.4	0.28	1.88	0.86	0.55	0.034
V2731	23.7	6.32	0.9	0.18	0.36	2.23	0.86	0.31	0.021
V2732	18.38	3.99	0.58	0.11	0.19	1.54	0.59	0.16	0.026
V2733	17.91	4.67	0.59	0.39	0.2	1.49	0.6	0.6	0.048
V2734	18.01	5.65	0.78	0.2	0.33	1.77	0.67	0.22	0.034
V2735	22.45	4.25	0.83	0.28	0.14	2.2	0.77	0.25	0.009
V2736	20.29	4.95	0.65	0.13	0.22	1.67	0.75	0.34	0.01
V2737	15.79	4.45	0.89	0.18	0.4	1.63	0.62	0.31	0.02
V2738	16.93	4.36	1	0.2	0.33	1.87	0.66	0.36	0.043
V2739	17.13	6.23	0.58	0.19	0.17	1.36	0.68	0.96	0.035
V2740	19.83	5.86	0.97	0.22	0.12	1.94	0.76	0.12	0.014
V2741	22.14	6.44	0.99	0.18	0.26	2.12	0.78	0.09	0.035
V2742	22.08	5.53	1.05	0.29	0.15	2.33	0.78	0.12	0.019
V2743	19.17	6.64	0.93	0.57	0.28	1.89	0.73	0.9	0.03
V2744	20.11	6.41	0.74	0.18	0.23	1.55	0.73	0.17	0.043
V2745	20.2	4.05	0.63	0.12	0.34	1.6	0.82	0.34	0.015
V2746	25.49	4.53	0.97	0.37	0.16	2.41	0.86	0.3	0.008
V2747	19.56	4.66	0.71	0.13	0.3	1.63	0.77	0.3	0.014
V2748	20.01	3.19	0.77	0.13	0.26	1.36	0.84	0.16	0.013
V2749	23.34	4.98	0.68	0.11	0.29	1.67	0.91	0.08	0.005
V2750	21.87	7.32	1.09	0.23	0.32	1.92	0.83	0.51	0.066
V2751	21.92	7.43	0.95	0.24	0.36	2.25	0.82	0.47	0.014
V2752	18.71	5.47	0.94	0.35	0.47	1.97	0.71	0.23	0.068
V2753	21.12	5.82	0.9	0.34	0.17	2.22	0.77	1.15	0.038
V2754	17.84	4.02	1.13	0.49	0.33	1.98	0.68	0.51	0.026
V2755	24.28	8.07	0.88	0.36	0.16	1.96	0.81	0.26	0.029
V2756	21.21	5.29	0.92	0.27	0.42	2.47	0.86	0.15	0.031

Appendix 4

TSNO	Ba	Cr	Cu	Li	Ni	Sc	Sr	V	Y	Zr*	La	Ce	Nd	Sm	Eu	Dy	Yb	Pb	Zn	Co
V2440	492	136	36	53	36	19	104	141	17	68	51	111	51	6	1	3	2	336	64	9
V2538	497	142	12	62	27	18	854	109	13	78	59	109	58	5	1	2	3	74	47	7
V2539	772	119	20	70	75	17	189	91	30	72	75	152	78	12	2	8	3	55	71	27
V2540	687	131	31	63	44	19	111	141	22	67	72	133	71	9	2	4	3	61	58	13
V2541	507	117	39	83	36	20	104	119	17	73	73	140	72	10	1	4	3	61	42	9
V2542	430	94	31	35	45	14	62	79	20	65	46	96	46	8	1	3	2	2955	75	6
V2543	864	97	29	67	40	16	102	80	22	63	58	114	58	9	1	4	3	149	62	9
V2544	705	94	30	93	44	17	111	126	16	62	64	123	63	9	1	3	2	262	38	11
V2545	6736	99	20	83	38	13	167	87	13	41	54	105	53	7	1	2	2	215	48	10
V2546	457	108	29	79	39	16	97	89	18	51	55	112	55	7	1	3	2	129	47	10
V2547	782	100	28	81	32	16	121	124	16	62	61	121	60	7	1	3	2	299	37	10
V2586	3774	72	20	94	56	15	128	96	20	55	56	147	59	9	1	7	2	118	63	29
V2587	719	94	18	79	48	14	118	88	18	51	59	117	58	8	1	3	2	690	70	20
V2588	505	114	38	43	41	16	123	88	26	72	64	123	64	9	2	4	3	405	39	7
V2589	672	128	22	72	22	16	594	91	9	56	52	102	50	6	1	2	2	69	30	6
V2590	505	101	32	48	35	16	122	82	23	60	63	125	63	9	2	4	2	310	38	5
V2591	462	88	34	50	20	15	92	91	12	54	51	91	50	5	1	2	2	226	32	5
V2592	452	102	38	62	27	15	86	99	13	55	52	100	51	5	1	2	2	237	28	6
V2593	496	111	35	43	33	16	117	80	24	65	61	120	61	9	2	4	3	289	36	6
V2594	337	82	34	60	21	16	77	86	12	64	51	94	49	5	1	2	2	228	25	4
V2595	353	105	43	57	29	16	77	75	17	72	53	99	52	6	1	2	2	198	38	8

TSNO	Ba	Cr	Cu	Li	Ni	Sc	Sr	V	Y	Zr*	La	Ce	Nd	Sm	Eu	Dy	Yb	Pb	Zn	Co
V2596	476	97	38	58	72	13	55	105	15	67	27	59	28	5	1	3	2	71	119	17
V2597	441	94	28	72	37	15	75	74	17	52	53	107	53	8	1	3	2	178	47	14
V2598	489	98	26	63	38	17	97	98	21	78	57	114	56	7	1	3	3	376	54	10
V2599	631	121	39	62	29	18	109	66	17	63	63	119	63	8	1	4	2	654	48	11
V2600	733	116	40	68	37	15	121	78	14	61	60	108	59	8	1	3	2	211	67	12
V2602	496	115	12	88	38	19	1173	108	28	102	69	124	69	10	2	5	3	62	46	10
V2603	694	131	59	90	29	21	131	120	21	77	68	126	68	9	2	4	3	81	51	6
V2604	531	81	46	76	39	17	102	130	18	60	56	107	56	8	2	4	2	417	68	13
V2605	377	94	54	86	30	18	75	92	19	69	56	101	56	7	1	4	2	111	32	12
V2606	854	99	41	108	54	19	514	109	26	74	69	129	70	9	2	5	3	64	47	12
V2607	2637	108	21	57	16	16	976	77	14	42	72	139	71	11	2	3	2	69	22	7
V2608	981	111	44	61	38	16	148	85	24	43	57	114	58	9	2	5	2	76	44	14
V2609	4790	111	22	40	25	16	607	79	13	45	63	127	62	10	2	3	2	55	35	7
V2610	600	101	21	48	34	15	131	79	23	64	55	108	56	9	2	4	2	84	32	9
V2611	453	131	33	171	53	17	70	114	15	58	42	79	43	6	1	3	2	1452	42	15
V2612	540	136	32	41	38	19	106	127	21	72	63	117	63	9	2	4	2	302	64	10
V2613	554	123	41	78	35	16	101	129	17	51	52	104	52	8	1	4	2	4498	38	13
V2614	837	93	24	126	49	17	102	113	27	48	61	123	62	10	2	5	2	1611	50	16
V2615	638	102	22	69	30	15	144	111	19	60	61	119	61	9	2	4	2	328	35	11
V2616	671	112	19	90	62	17	196	101	25	46	67	135	68	10	2	5	3	196	58	16
V2617	739	110	16	83	55	17	219	97	29	44	67	130	68	11	2	5	3	175	59	17
V2618	778	107	23	65	58	15	71	88	18	48	40	81	41	7	1	3	2	371	68	14

TSNO	Ba	Cr	Cu	Li	Ni	Sc	Sr	V	Y	Zr*	La	Ce	Nd	Sm	Eu	Dy	Yb	Pb	Zn	Co
V2619	485	115	40	46	41	16	102	72	19	59	50	93	50	6	1	3	2	83	54	13
V2620	462	109	32	43	33	15	107	74	21	58	55	105	55	7	1	4	2	184	34	8
V2621	439	114	35	48	33	16	103	72	21	60	57	107	57	7	1	4	2	101	34	6
V2622	528	138	32	71	39	22	105	95	21	57	69	137	68	9	2	4	2	95	41	7
V2623	500	129	23	80	23	18	801	97	10	56	58	113	56	5	1	2	2	46	26	6
V2624	685	137	52	77	30	18	1289	116	11	53	63	126	61	8	1	2	2	45	40	8
V2625	673	112	35	109	42	16	128	97	14	44	48	91	47	5	1	3	2	1130	65	15
V2626	592	101	18	54	44	16	121	78	24	49	56	114	56	10	2	4	2	1440	47	9
V2627	626	88	10	103	67	19	89	110	38	58	70	140	72	12	2	7	3	86	61	19
V2628	335	80	38	66	34	19	77	109	19	60	57	118	57	8	1	3	2	175	27	11
V2629	706	78	12	102	43	18	104	96	24	51	64	126	64	9	2	4	2	1957	53	12
V2630	542	79	24	71	43	16	81	89	17	54	47	91	47	5	1	3	2	4717	91	12
V2631	481	82	36	49	35	17	122	77	27	66	59	111	60	8	2	5	2	700	39	6
V2632	652	100	29	64	40	16	82	80	18	41	57	110	57	8	2	4	2	186	60	11
V2634	528	100	40	76	32	16	99	92	14	44	54	107	53	7	1	2	2	142	30	7
V2635	414	116	36	68	39	18	87	108	18	72	54	99	54	5	1	3	2	3004	63	12
V2636	546	115	29	90	42	15	119	95	17	46	56	106	56	7	1	3	2	325	35	12
V2637	353	74	23	48	21	13	87	84	11	45	49	88	48	5	1	2	2	1254	26	5
V2638	434	64	24	46	21	12	87	79	12	48	47	87	46	5	1	2	2	598	32	8
V2639	661	80	28	82	41	14	73	83	16	55	45	91	45	3	1	3	2	452	84	14
V2640	434	122	36	70	31	18	98	116	21	72	58	111	58	8	1	3	2	307	53	7
V2641	516	113	28	88	28	16	107	92	21	58	60	115	60	8	1	4	2	2151	34	12

TSNO	Ba	Cr	Cu	Li	Ni	Sc	Sr	V	Y	Zr*	La	Ce	Nd	Sm	Eu	Dy	Yb	Pb	Zn	Co
V2642	717	102	29	93	36	18	123	139	20	76	70	140	69	10	2	4	3	2557	38	11
V2643	887	76	15	116	44	16	119	92	17	42	66	136	65	7	2	4	2	1296	84	22
V2644	859	81	14	118	44	15	118	92	17	45	63	126	63	9	2	4	2	884	79	21
V2645	529	129	31	42	35	19	104	120	22	87	65	124	64	6	2	4	3	174	59	10
V2646	588	141	61	93	26	19	1689	149	10	64	75	150	73	11	2	2	2	124	25	8
V2647	410	131	30	65	41	19	116	110	21	73	68	124	67	8	2	4	3	422	55	10
V2648	476	79	25	74	38	17	110	95	20	63	62	125	62	9	2	4	2	3792	53	11
V2649	598	121	12	94	50	18	154	109	25	67	75	135	74	8	2	4	3	321	58	12
V2651	1770	114	27	128	46	19	197	121	26	71	64	126	65	10	2	5	3	1781	121	19
V2652	486	66	29	70	36	16	132	93	23	60	65	127	65	8	2	4	2	2011	42	9
V2653	540	98	36	118	33	21	115	121	17	78	64	127	63	6	1	3	3	194	45	13
V2654	683	97	32	57	28	22	141	119	20	75	75	146	74	9	2	4	3	827	29	6
V2655	800	79	27	80	34	18	135	105	20	72	70	135	69	9	2	4	3	812	36	12
V2656	620	129	23	122	35	17	101	123	16	91	68	127	67	6	1	3	3	76	43	8
V2657	570	117	34	59	24	17	97	93	20	66	62	116	61	7	1	3	2	1308	47	7
V2658	1042	99	12	98	66	17	116	99	31	55	75	145	76	10	2	6	3	122	68	21
V2659	537	112	41	47	39	15	95	77	19	62	55	102	55	5	1	4	3	115	54	15
V2660	544	127	29	73	33	18	104	118	19	82	60	118	59	5	1	3	3	363	45	8
V2661	497	123	42	54	23	18	96	89	20	68	62	114	61	7	2	3	3	3215	31	7
V2662	643	90	95	66	27	19	138	171	17	77	70	134	69	8	2	3	2	7839	41	6
V2663	643	110	26	73	37	16	78	86	16	43	55	111	54	6	1	3	2	3046	47	14
V2664	428	101	36	113	31	17	110	110	20	116	74	139	73	8	2	3	3	206	37	12

TSNO	Ba	Cr	Cu	Li	Ni	Sc	Sr	V	Y	Zr*	La	Ce	Nd	Sm	Eu	Dy	Yb	Pb	Zn	Co
V2665	644	126	30	44	25	20	115	112	19	72	69	142	68	8	2	3	2	672	24	5
V2666	566	129	30	60	33	15	103	134	19	77	60	121	60	8	1	3	3	490	40	12
V2667	445	110	32	46	26	15	100	77	15	68	56	96	56	5	1	3	2	369	29	10
V2677	415	110	37	63	21	17	80	141	16	64	48	86	37	6	1	3	2	2523	25	7
V2678	419	105	23	56	24	13	89	89	15	55	43	71	28	4	1	3	2	1602	40	8
V2679	562	107	10	70	32	15	103	98	21	57	57	97	45	7	2	4	2	238	50	15
V2680	729	91	15	73	39	13	88	78	17	36	46	85	38	7	1	4	2	195	88	15
V2681	731	114	13	159	46	16	97	96	16	41	47	83	41	7	1	4	2	169	109	18
V2682	392	134	28	135	40	17	66	171	17	61	42	77	38	7	1	4	2	443	61	17
V2683	500	124	32	134	43	19	94	99	18	42	51	92	44	6	1	4	2	241	61	12
V2684	602	135	25	142	45	20	100	114	22	43	55	99	48	9	2	5	3	2886	62	10
V2685	645	115	35	79	55	18	128	91	24	45	50	91	41	9	2	7	3	12008	106	14
V2686	323	136	34	134	46	17	73	174	18	76	41	69	39	6	1	4	2	562	59	14
V2687	681	108	16	79	34	16	96	106	18	42	51	84	39	7	1	4	2	320	90	13
V2688	393	116	34	71	25	15	92	136	18	70	43	81	38	7	1	4	2	301	32	9
V2689	962	107	39	64	30	13	140	99	18	58	47	86	44	8	1	5	2	1206	47	11
V2690	1033	103	29	107	46	17	120	107	22	60	51	91	46	9	2	6	3	168	67	23
V2691	661	119	43	64	22	17	131	116	15	61	49	89	40	7	1	4	2	846	33	6
V2692	501	114	47	73	22	18	117	108	14	44	56	102	47	7	1	3	2	1154	31	5
V2693	457	134	35	99	33	19	108	121	18	61	51	89	39	5	1	4	2	1065	48	7
V2694	763	121	25	86	38	18	146	99	21	55	59	114	63	12	2	5	2	921	42	8
V2695	536	131	42	130	43	18	105	135	18	61	50	84	36	6	1	4	2	389	76	9

TSNO	Ba	Cr	Cu	Li	Ni	Sc	Sr	V	Y	Zr*	La	Ce	Nd	Sm	Eu	Dy	Yb	Pb	Zn	Co
V2696	556	119	10	58	36	16	119	114	21	53	56	97	46	8	2	4	3	85	50	10
V2697	726	117	49	42	26	16	135	101	16	59	47	86	36	7	1	4	2	175	44	7
V2698	883	111	37	41	31	16	83	89	21	66	44	81	40	7	1	7	2	182	59	11
V2699	634	126	32	97	35	18	103	102	16	58	50	87	34	6	1	4	2	521	49	10
V2700	764	107	32	127	49	15	113	89	18	45	44	74	35	7	1	5	2	600	50	16
V2701	517	114	44	71	24	16	124	130	16	59	53	95	46	6	1	4	2	688	25	10
V2702	1155	105	34	150	47	15	115	85	19	29	49	95	52	8	2	5	2	1760	98	18
V2703	705	117	20	87	55	17	92	98	20	36	48	83	48	8	2	5	2	585	101	19
V2704	657	115	20	156	50	16	94	96	20	38	48	90	48	8	2	5	2	268	93	17
V2705	713	105	28	100	41	14	99	82	15	44	43	72	29	6	1	4	2	2067	46	18
V2706	464	105	28	46	25	13	103	116	16	62	41	75	34	5	1	4	2	285	28	9
V2707	417	136	33	75	34	19	100	124	17	62	48	80	36	6	1	4	2	174	65	13
V2708	572	140	32	71	43	19	93	139	19	65	51	84	34	6	1	4	3	406	62	11
V2709	515	131	33	96	36	19	102	122	20	75	52	92	39	7	1	4	3	1660	56	9
V2710	384	137	29	79	32	19	106	129	17	65	48	83	30	5	1	3	2	197	57	8
V2711	793	122	25	88	32	18	118	105	18	53	52	97	47	7	1	4	2	514	33	10
V2712	487	119	34	49	21	16	96	105	14	52	47	78	33	5	1	3	2	140	25	5
V2713	361	129	32	62	33	15	114	134	17	56	49	87	42	8	1	4	2	661	40	12
V2714	436	138	35	144	40	21	202	124	21	85	53	98	47	7	1	5	3	1047	77	10
V2718	431	114	21	70	35	18	68	111	23	49	52	91	47	8	2	4	3	115	56	13
V2719	439	111	20	66	33	17	69	108	22	48	52	89	42	8	2	5	3	131	54	15
V2720	607	131	38	64	23	18	95	150	18	79	47	86	34	5	1	4	2	9119	34	14

TSNO	Ba	Cr	Cu	Li	Ni	Sc	Sr	V	Y	Zr*	La	Ce	Nd	Sm	Eu	Dy	Yb	Pb	Zn	Co
V2721	607	128	29	60	26	20	116	110	17	53	54	103	50	8	1	4	2	2157	26	5
V2722	676	112	28	55	23	18	122	96	14	44	55	105	50	8	1	4	2	3410	24	5
V2723	834	103	30	99	55	16	101	85	22	35	52	92	51	9	2	6	2	1734	46	21
V2724	658	148	11	94	32	19	1658	124	15	53	70	114	52	8	2	3	2	121	39	9
V2725	570	107	25	112	38	14	86	88	13	42	44	73	29	6	1	4	2	229	54	13
V2726	542	112	27	116	40	16	105	93	21	48	54	94	47	9	2	5	2	349	65	15
V2727	1028	91	23	32	24	12	515	66	14	33	56	98	62	9	2	4	2	79	28	12
V2728	892	133	43	53	24	18	129	119	19	62	59	97	48	8	2	5	3	325	35	9
V2729	548	146	32	67	26	18	112	181	20	88	58	105	50	8	2	6	3	1084	30	11
V2730	658	123	55	78	32	17	163	115	18	65	60	105	56	9	2	5	2	684	81	10
V2731	656	138	28	77	35	17	128	149	19	72	63	107	57	11	2	5	3	913	37	11
V2732	384	98	23	54	22	13	82	78	10	35	47	82	36	5	1	3	1	264	25	6
V2733	544	97	27	53	23	13	109	83	11	37	48	83	37	6	1	4	2	662	42	8
V2734	624	108	33	61	34	14	100	99	16	53	48	88	37	6	1	4	2	166	29	10
V2735	437	123	22	78	20	16	732	86	9	56	50	91	43	5	1	2	2	83	22	5
V2736	395	115	33	50	26	16	104	94	20	60	59	103	52	9	2	5	3	150	26	5
V2737	447	87	26	42	30	13	93	53	20	51	44	82	42	7	2	5	2	532	28	6
V2738	509	94	26	54	39	14	104	67	21	52	50	100	51	9	2	5	2	234	35	8
V2739	535	104	29	49	28	14	64	88	15	58	43	79	30	6	1	4	2	367	49	8
V2740	609	107	11	110	55	17	79	95	34	48	65	126	74	14	3	8	3	220	75	18
V2741	1836	114	36	153	45	17	103	96	28	49	56	104	60	11	2	7	3	2479	75	22
V2742	732	118	15	132	68	18	119	110	32	44	64	120	73	14	3	7	3	254	75	23

TSNO	Ba	Cr	Cu	Li	Ni	Sc	Sr	V	Y	Zr*	La	Ce	Nd	Sm	Eu	Dy	Yb	Pb	Zn	Co
V2743	1004	120	32	77	48	16	140	95	20	46	48	83	41	7	2	4	2	78	50	13
V2744	379	118	46	62	24	16	87	90	15	55	45	82	34	5	1	3	2	276	35	9
V2745	408	118	25	40	25	14	96	129	19	67	46	82	36	6	1	4	2	131	28	6
V2746	830	153	64	106	21	18	1860	152	7	52	65	131	83	8	1	2	2	105	25	7
V2747	452	113	33	58	23	16	132	89	15	54	48	87	38	6	1	3	2	284	28	5
V2748	391	108	28	80	36	14	98	97	17	54	47	83	38	5	1	4	2	828	35	9
V2749	345	140	56	67	22	16	92	97	20	80	48	85	37	5	1	4	2	155	29	6
V2750	545	127	41	103	46	18	99	90	22	56	52	92	49	9	2	5	3	202	60	14
V2751	613	143	38	60	34	20	112	160	21	90	50	87	40	6	1	4	3	153	65	7
V2752	1080	105	20	94	49	17	108	105	21	36	47	83	47	9	2	6	2	446	77	19
V2753	906	113	18	82	61	18	112	84	30	43	66	122	72	12	3	7	3	71	71	16
V2754	605	98	26	48	31	15	118	73	22	58	46	85	42	8	1	4	2	141	37	7
V2755	621	140	16	90	42	18	969	111	23	60	60	107	55	10	2	5	3	69	44	10
V2756	610	121	42	79	29	18	126	88	27	47	57	103	57	10	2	6	3	76	37	11